AGRICULTURAL *Chemicals*

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- Dow Marketing Program
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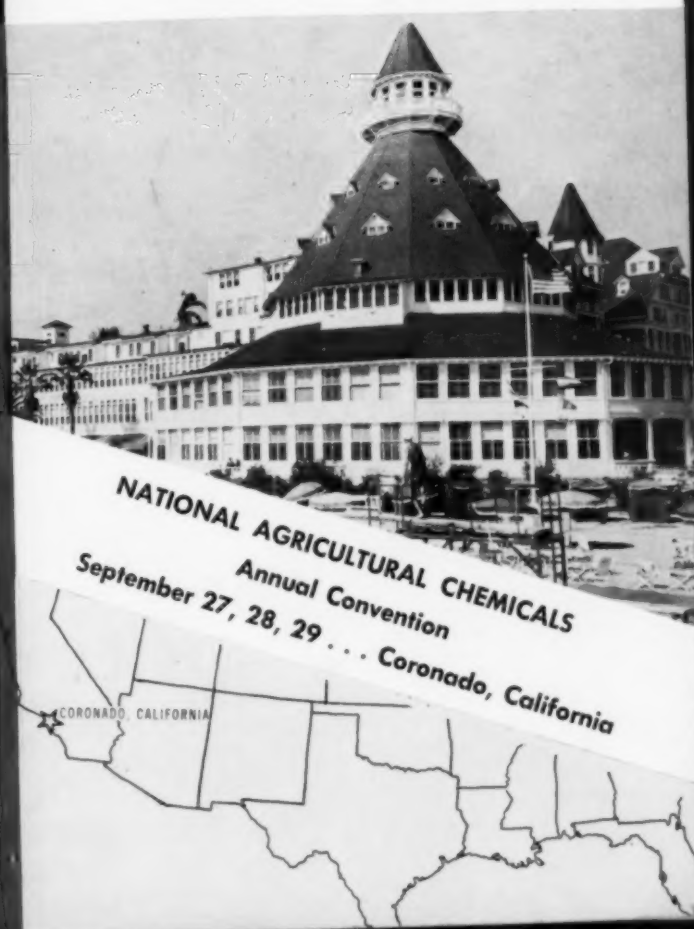
- Northwest Orchard Tours
- Bagging Fertilizer

APPLICATOR SECTION

SEPTEMBER, 1960



"This new CHASE POLY-PLY multiwall bag is a real Problem Solver"

Says Lee Schram, Multiwall Bag Buyer, Morton Salt Company

The Morton Salt Company needed a new and better bag for its salt shipments—a moisture-resistant bag that would be easier to handle and ship, more flexible at low temperatures, highly resistant to abrasion and rupture, yet economical in cost.

To solve this problem, Chase developed the Poly-Ply Multiwall Bag featuring an entirely new construction. It combines—for the first time—the advantages of a ply of light-weight sheet polyethylene and heavy-duty multiwall paper. It provides excellent moisture protection...extra strength...new ease of handling...flexibility even at temperatures way below zero. After six months testing under commercial conditions Morton officials report highly satisfactory results!

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New and Unique Construction: separate, intermediate ply of sheet polyethylene, shielded by heavy-duty kraft paper inside and out, assures effective moisture protection, strength and easy handling advantages.

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DENNIS ROBERTSON
was appointed P.C.A. Sales Representative for Florida in 1958. A graduate of the University of Virginia, he has had wide sales experience, spending a number of years in the fertilizer industry in the south-eastern states.

Your Men on our payroll

These men are two of the members of the P.C.A. sales team serving the fertilizer industry. While they are on our payroll, their chief responsibility is to you. Selling potash is but part of their job; the most important part is furnishing you with whatever service and information you require . . . both have the experience and background to do the job well. The P.C.A. salesman is your man . . . make good use of him.

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New 60% Standard Muriate
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- N. S. Koos & Son Co.
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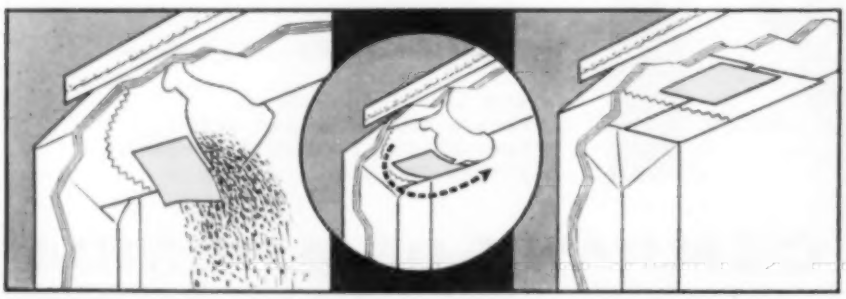
It's been more than three years since Bemis perfected the DUETTE, the multiwall bag valve-on-a-valve that gives double sift protection for granular, pelletized or pulverized products.

In that time, DUETTE Multiwalls have been used by many of the leading chemical and fertilizer manufacturers, with consistently gratifying results. The diagrammatic pictures show why . . .



WON'T CLOG . . . The Magic Yellow check flap falls freely aside from the valve slit. The sleeve won't choke or clog the packing spout.

POSITIVE CLOSING ACTION . . . This diagrammatic picture shows the action as the Magic Yellow flap starts to close over the valve slit.

CAN'T SIFT . . . When the bag is filled, the flap, acting as a check valve, completely overlaps and covers the valve slit, to stop sifting.

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This Month's Cover

National Agricultural Chemicals Association holds its annual meeting at Hotel del Coronado, Coronado, California, Sept. 27-29. See story page 33.

Publisher
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Vol. 15, No. 9 September, 1960

AGRICULTURAL *Chemicals*

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MEMBER AUDIT BUREAU OF CIRCULATIONS

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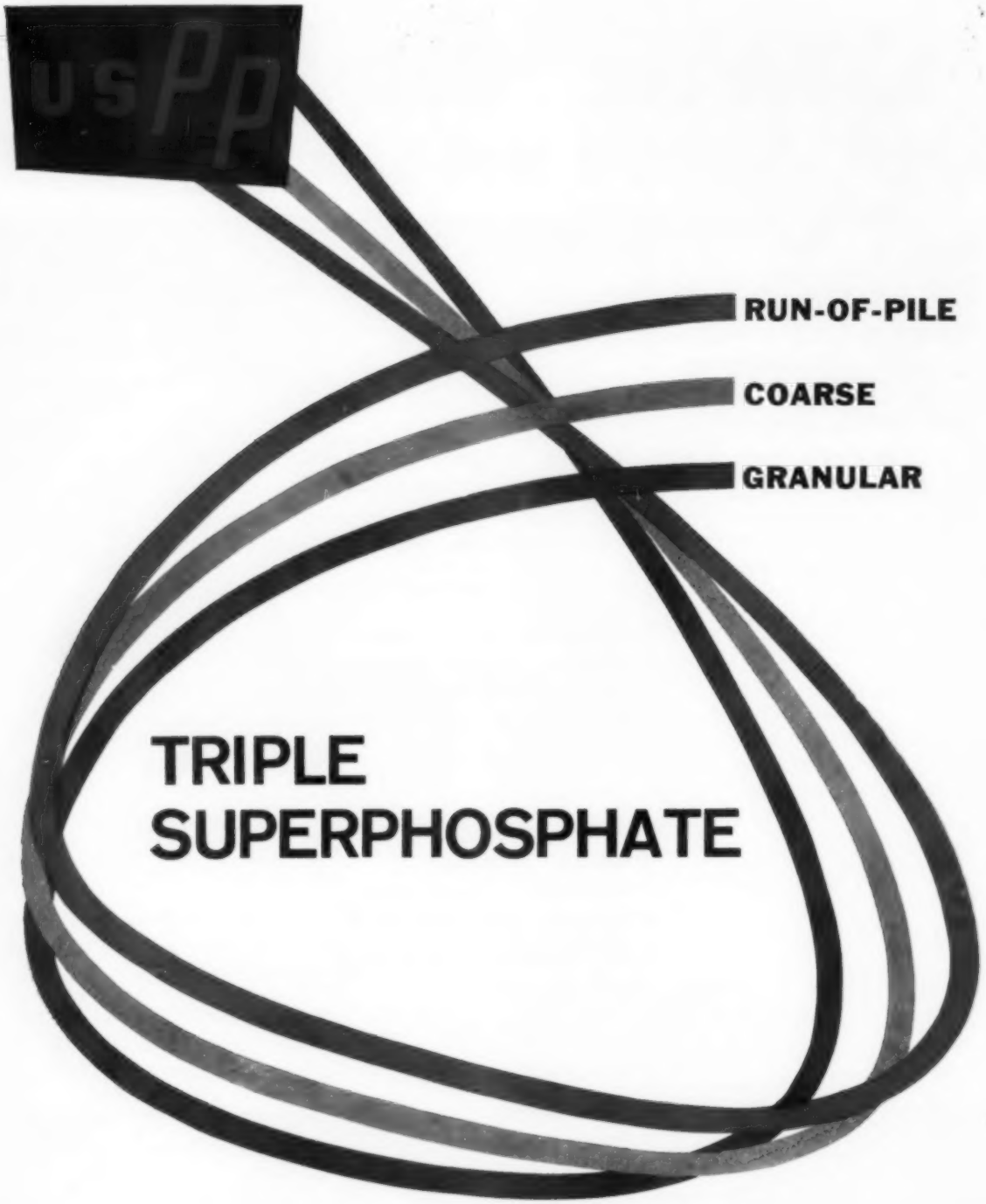

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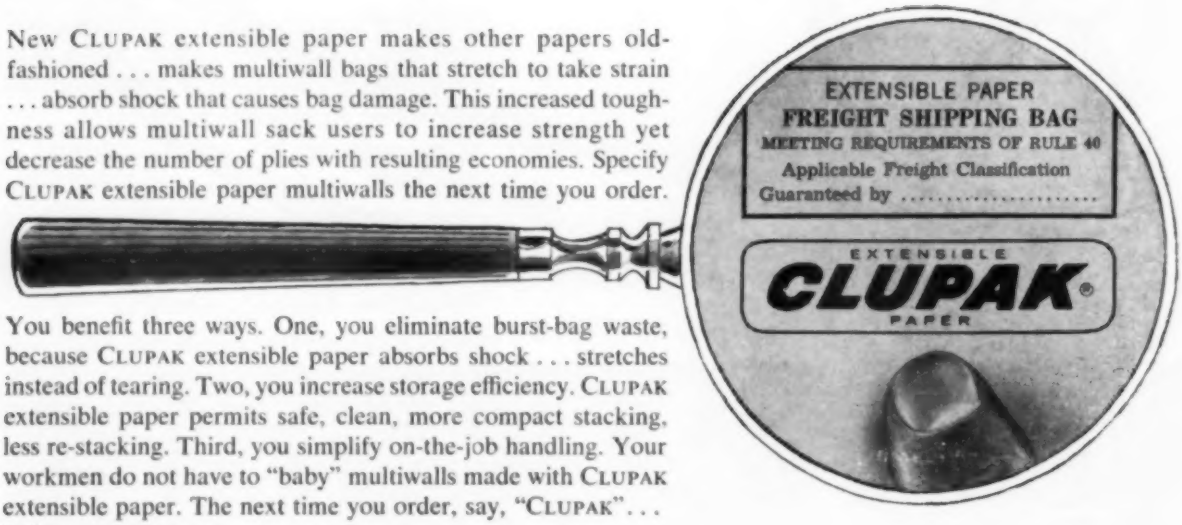
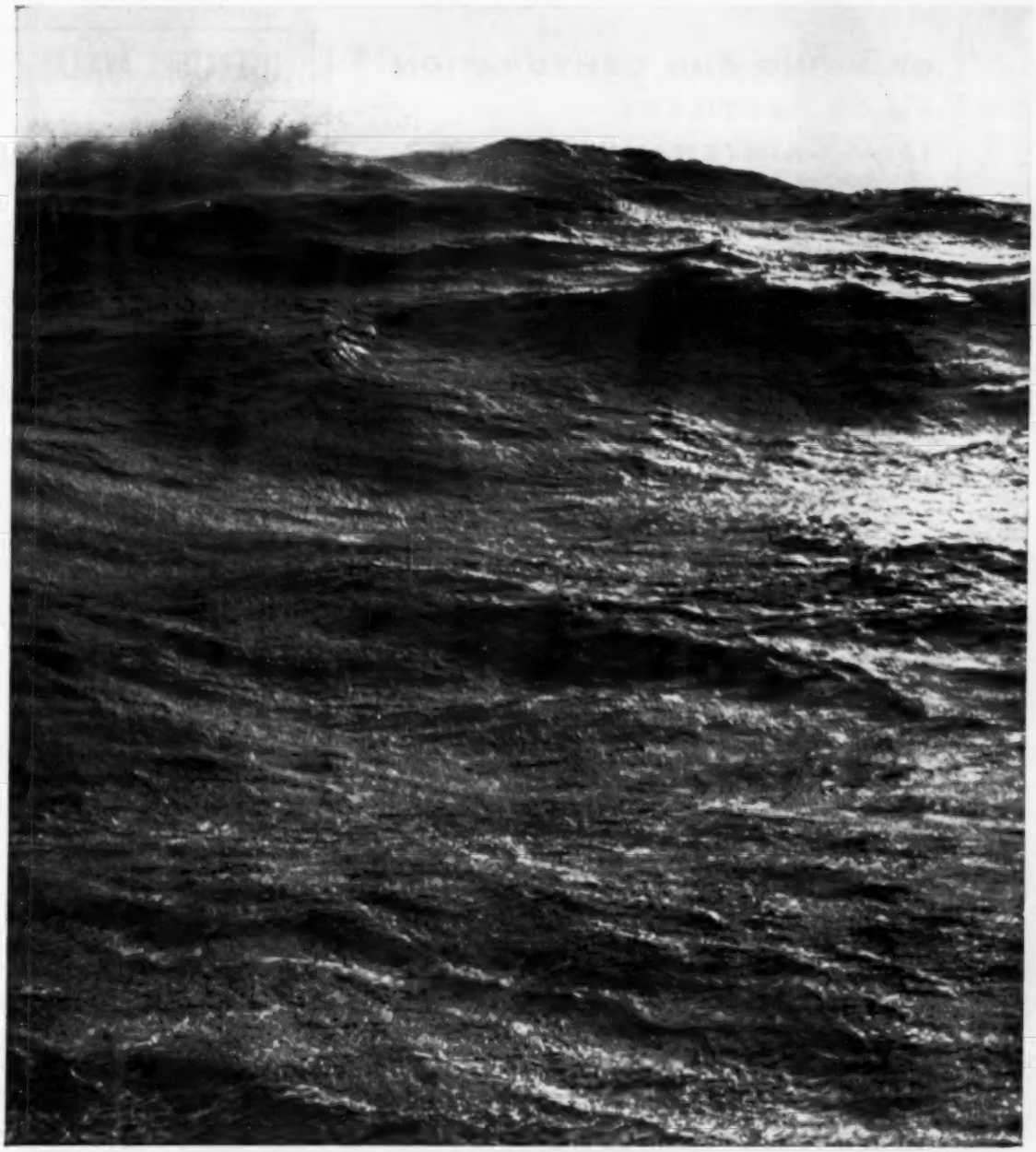


You benefit three ways. One, you eliminate burst-bag waste, because CLUPAK extensible paper absorbs shock . . . stretches instead of tearing. Two, you increase storage efficiency. CLUPAK extensible paper permits safe, clean, more compact stacking, less re-stacking. Third, you simplify on-the-job handling. Your workmen do not have to "baby" multiwalls made with CLUPAK extensible paper. The next time you order, say, "CLUPAK"... before you say paper.

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications. Clupak, Inc., 530 5th Ave., N. Y. 36, N. Y.



Have you seen the urea that's good enough to cross the Atlantic Ocean?

Urea so made that it can sit on the docks at Antwerp, cross over 3,000 miles of ocean and be delivered to you anywhere in the U.S. *dry, dustless and free-flowing* must be very good material indeed. It is.

Matter of fact, it is probably the most unusual urea prill available in America today. It's *uncoated!* Very much to your advantage. These prills are so skillfully made you get less moisture than with coated material. They are guaranteed to be free-flowing. You get better storage. You get *no* dust. And—you get a guaranteed 46% nitrogen at the same price as 45% material!

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LITERATURE AVAILABLE

The bulletins listed below are available from the organizations by which they are prepared.

FERTILIZERS, Production, Consumption, Prices and Trade in Europe. A report on the fertilizer situation in Europe for the period from 1956 to 1959. Given are figures for production, trade, and consumption and information on fertilizer prices. Published by the Organization for European Economic Cooperation, Paris.

AC

EVALUATION OF HERBICIDES FOR CONTROL OF WEEDS IN FIELD CROPS, by W. C. Elder, Oklahoma State University. A progress report for 1956 to 1958 of a continuous program by the university of testing and evaluating herbicides as they become available. Among the products covered in this report are Simazin, Eptam, 2,4-DB, Diuron, Dalapon, Alanap, and Randox. Processed Series P-324, July, 1959.

AC

INSECTICIDAL CONTROL OF UNDERGROUND INSECTS OF CORN, by J. H. Bigger and R. A. Blanchard, University of Illinois, Urbana. A report of a five-year study of Illinois cornfields, the booklet lists insects and control measures. Bulletin 641.

AC

CHEMICAL CONTROL OF DISEASES AFFECTING TURF OF GOLF GREENS, by D. F. Wadsworth. An evaluation of the effectiveness of several fungicides or fungicide combinations. Oklahoma State University Exp. Sta. Processed Series P-340, Feb. 1960.

AC

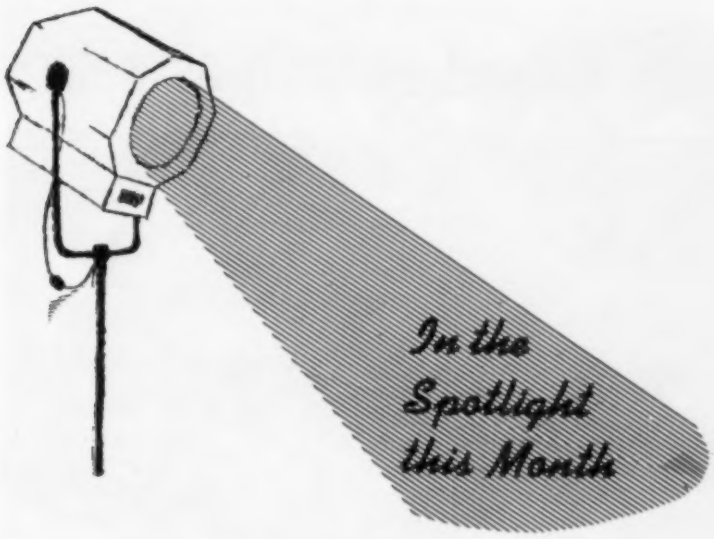
THE INFLUENCE OF INSECTICIDES ON HOUSE FLY POPULATION TRENDS, by Raimon L. Beard. This is part 3 of a series of laboratory studies on house fly populations and deals with insecticides as ecological factors affecting insect numbers. Connecticut Agr. Exp. Sta. Bulletin 631, March 1960.

AC

CHEMICALS AND THE FOOD INDUSTRY, by Robert M. Ikeda and Donald G. Crosby. A discussion of key technical problems of the food industry and a description of how chemicals are or can be used to solve the problems. University Manual No. 26, Office of Agricultural Publications, 207 University Hall, U. of California, Berkeley.

AC

A COMBINATION ANHYDROUS AMMONIA APPLICATOR AND FOUR-ROW BEDDER, by O. B. Wooten, F. E. Fulgham, and E. B. Williamson. A description of work done with various types of applicators to overcome the problem of planting with four-row equipment on beds formed with a three-row middlebreaker. Mississippi Agr. Exp. Sta. Bulletin 592, April 1960.



- **Trace Elements** . . . Molybdenum applications to crops such as alfalfa, peas, soybeans, lettuce and spinach result in substantially increased yields in molybdenum-deficient soils. Foliar sprays of the element have also been found to control yellow spot, a disease of citrus trees. Because of its relation to soil acidity, a third important function of molybdenum is its role in land improvement. It is the only trace element that becomes more available as the soil becomes more alkaline. Page 31.

- **Orchard Pesticides** . . . New insecticides promising in control of pear psylla include dimethoate, phosphamidon and three new Bayer materials. Sevin is reported to be an effective apple thinner by some growers, while others report some damage with this pesticide. For scabby orchards, growers are told to use Ziram, Captan or Cyprex. Page 36.

- **Phosphorus for Potatoes** . . . "Neglect phosphorus and you slash your profits" summarizes the conclusion of investigators of potato growing problems. Phosphorus is an essential food for the potato plant in development of quality tubers. Page 34.

- **Selling Pesticides** . . . Iowa Sociologists, Bohlen and Beal, recently completed a survey on use of pesticides in Iowa — confirming the fact that farmers rely heavily on dealer recommendations, and on brands sold by dealer. Unhappily, dealers, in general, have done little to promote sales actively. Page 40.

- **Sprayable Calcium Arsenate** . . . Although long recognized as a highly effective cotton pest control chemical, calcium arsenate has not been widely used for that purpose because of drift hazards associated with the dust form of the chemical. Last season, however, a new "spray-on" formulation of calcium arsenate was used in Louisiana and Arkansas with good control results and low drift. Page 56.

INTERNATIONAL MARKET ROUNDUP

HEAVY fertilizer shipments continue to many parts of the world, with prices firming and stocks having a good relation to actual movements. Recent substantial purchases include the following:

Korea:

The United States sold the Korean Government 13,000 metric tons of coke-oven ammonium sulfate, 17,000 tons of urea, 22,000 tons of triple superphosphate and 8,300 tons of complex fertilizers, with Japan selling 22,000 tons of urea, 22,000 tons of fused phosphate and 1200 tons of ammonium chloride. Canada supplied about 6,000 tons of complex fertilizers and ammonium nitrate. In addition, Korean private importers took very heavy shipments of ammonium sulfate, principally from Japan, with some material coming from the United States as well.

India:

India purchased 25,000 tons of ammonium sulfate from Europe, 20,000 tons from Japan, 10,000 tons of calcium ammonium nitrate and 7,250 tons of ammonium sulfate nitrate from Europe, 11,000 tons of urea from Europe, 8,000 tons of urea from Japan, and 8,000 tons of urea from the United States.

Formosa:

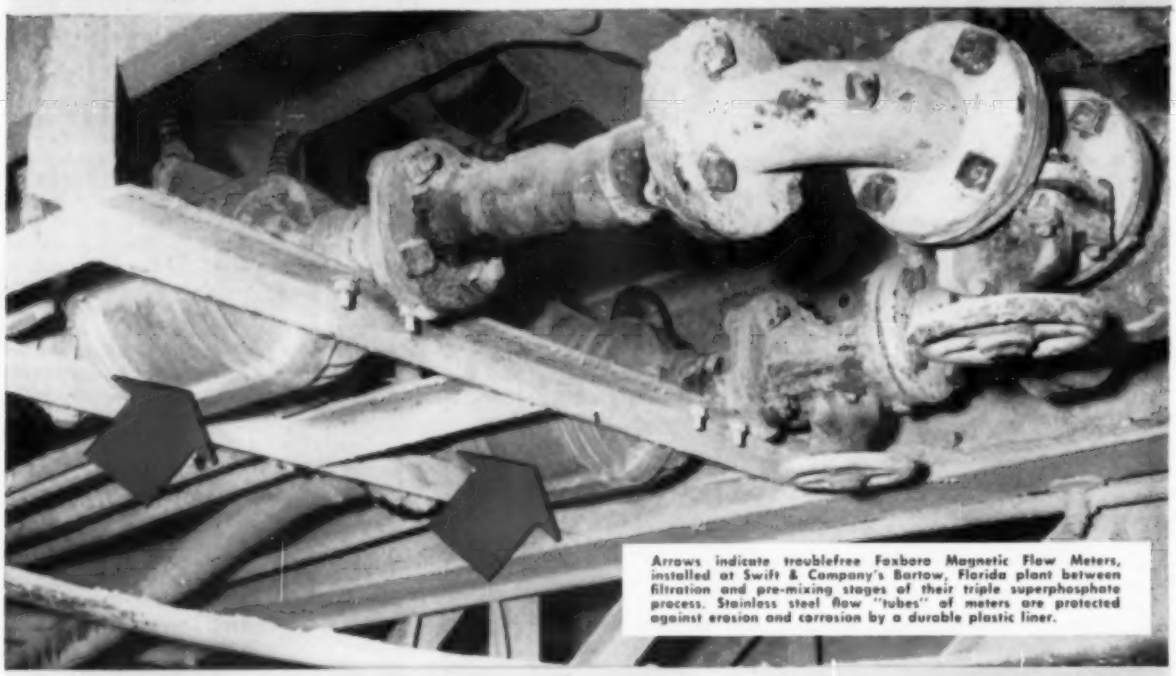
This country recently purchased 27,000 tons of potash from Europe and 10,000 tons of 16-20-0 from the United States. Additional purchases of these materials are expected to be made shortly. Generally speaking, availability of materials is sufficient to meet the demand but the surplus is not as great as it was sometime ago and, as a result, the tone of the market has improved considerably.

North Africa:

Considerable activity is taking place in this part of the world in order to take advantage of natural gas which will become available in the Sahara oil fields as well as the local phosphate rock deposits. The Royal Dutch Shell group will build a factory for ammonium phosphate in Morocco and the Tunisian Government also is conducting discussions designed to complete a similar project in that country. It is understood that Tunisia expects to receive financing from the United States Development Loan Fund. Possibly, Algeria also will build a fertilizer plant. The major output of all these plants will have to be exported due to limited domestic demand and it is expected that these tonnages, as well as the material derived from the nitrogen plant which has been discussed for sometime now in Iran, will seek outlets. Some shift in international supply patterns is possible as a result of this activity.

Prepared by International Ore and Fertilizer Co., New York

"Ornery" Phosphate Slurry Metered as Easily as Water!



Arrows indicate troublefree Foxboro Magnetic Flow Meters, installed at Swift & Company's Bartow, Florida plant between filtration and pre-mixing stages of their triple superphosphate process. Stainless steel flow "tubes" of meters are protected against erosion and corrosion by a durable plastic liner.

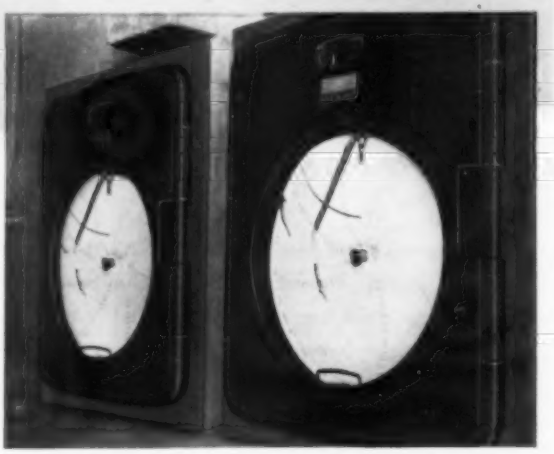
. . . *by Foxboro Magnetic Flow Meters at*

Swift & Company

Measuring slurry is duck soup for two Foxboro Magnetic Flow Meters now used in the production of Swift & Company's Agricola plant food. Here's the story.

The company was shooting for uniform pre-mixing and quality control. Needed was an accurate means of measuring the flow of partially filtered phosphoric acid slurry. Orifice plates, or anything that restricted flow, eroded. Pressure taps quickly fouled. Even *purged*, long-cone Venturi tubes plugged! Solution? *Electrical* measurement with Foxboro Magnetic Flow Meters. Their smooth, pipe-like interiors simply *ignore* the suspended phosphate solids. There's no erosion, no fouling. Two flush-mounted electrodes "pick up" flow measurement . . . Foxboro Dynalog* instruments record it directly on a linear scale chart. And these records are accurate to 1% of full scale!

Find out exactly how the Foxboro Magnetic Flow Meter works . . . how it can efficiently and accurately meter the "impossible" in your plant. Write for Bulletin 20-14. **The Foxboro Company, 139 Norfolk St., Foxboro, Mass., U.S.A.** *Reg. U. S. Pat. Off.



By watching slurry flow rates on Dynalog Recorder charts, operators precisely regulate feed of H_2SO_4 to the reactor tanks . . . permitting better quality control right down the line.

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INDUSTRY MEETING CALENDAR

Sept. 11-14—Canadian Agricultural Chemicals Association, Britannia Lodge, Muskoka, Ontario, Canada.

Sept. 11-15—138th National Meeting of American Chemical Society. With Chemical Exposition. Statler Hilton Hotel, New York.

Sept. 12-14—Entomology Society of Canada, 10th Annual Meeting with Entomology Society of Saskatchewan, Saskatoon, Saskatchewan.

Sept. 24-26 — Western Agricultural Chemicals Association, 31st Annual Meeting, Palm Springs Riviera Hotel, Palm Springs, Calif.

Sept. 27-29 — National Agricultural Chemicals Association, Annual Meeting, Del Coronado Hotel, Coronado, Calif.

Sept. 29-30 — Northeast Fertilizer Conf., Hotel Hershey, Hershey, Pa.

Oct. 5-6—Southeast Fertilizer Conf., Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 10-11 — Four-State Aerial Applicators Conf., Hotel Chinook, Yakima, Wash.

Oct. 10-12 — Association Official Agricultural Chemists, Shoreham Hotel, Washington, D. C.

Oct. 13-14 — Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D. C. (States' Relations Committee Meets at 8:15 p.m., Oct. 13).

Oct. 17-18—Fertilizer Section, National Safety Congress, Chicago.

Oct. 27-28 — Eastern Branch Entomological Society of America annual meeting, Hotel New Yorker, N. Y.

Nov. 3-4—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D. C.

Nov. 3-4 — Pacific Northwest Plant Food Assn., Annual Convention, Boise, Idaho.

Nov. 3-6 — Texas Aerial Applicators Association, Annual Convention, Echo Motor Hotel, Edinburg, Texas.

Nov. 9-11—National Fertilizer Solutions Association, Annual Convention, Peabody Hotel, Memphis, Tenn.

Nov. 13-15 — California Fertilizer Assn., del Coronado Hotel, Coronado, Calif.

Nov. 14 — Salesmen's Association of the American Chemical Industry, Annual Sales Clinic, Roosevelt Hotel, New York.

Nov. 14-18—Mexican Association of Insecticide and Fertilizer Manufacturers, annual convention, Merida, Yucatan, Mexico.

Nov. 28-30 — Soil & Crop Science Society of Florida, Annual Meeting, Fort Harrison Hotel, Clearwater, Fla.

Nov. 28-Dec. 1—Entomological Society of America, 8th Annual Meeting, Haddon Hall Hotel, Atlantic City, N. J.

Nov. 30 — New Jersey annual fertilizer conference, Rutgers University, New Brunswick, N. J.

Dec. 5-7—Carolinas-Virginia Pesticide Formulators Assn. annual meeting, Carolina Hotel, Pinehurst, N. C.

Dec. 5-9—American Society of Agronomy, Annual Meeting, Morrison Hotel, Chicago.

Dec. 12-14 — North Central Weed Control Conference, Hotel Schroeder, Milwaukee, Wis.

Jan. 5-7 — California Aerial Applicators Association, 11th Annual Convention, El Dorado Hotel, Sacramento, Calif.

Jan.12-13 — Arizona Aerial Applicators Association, 8th Annual Meeting, The Wigwam, Litchfield Park, Ariz.

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- **SULPHUR**
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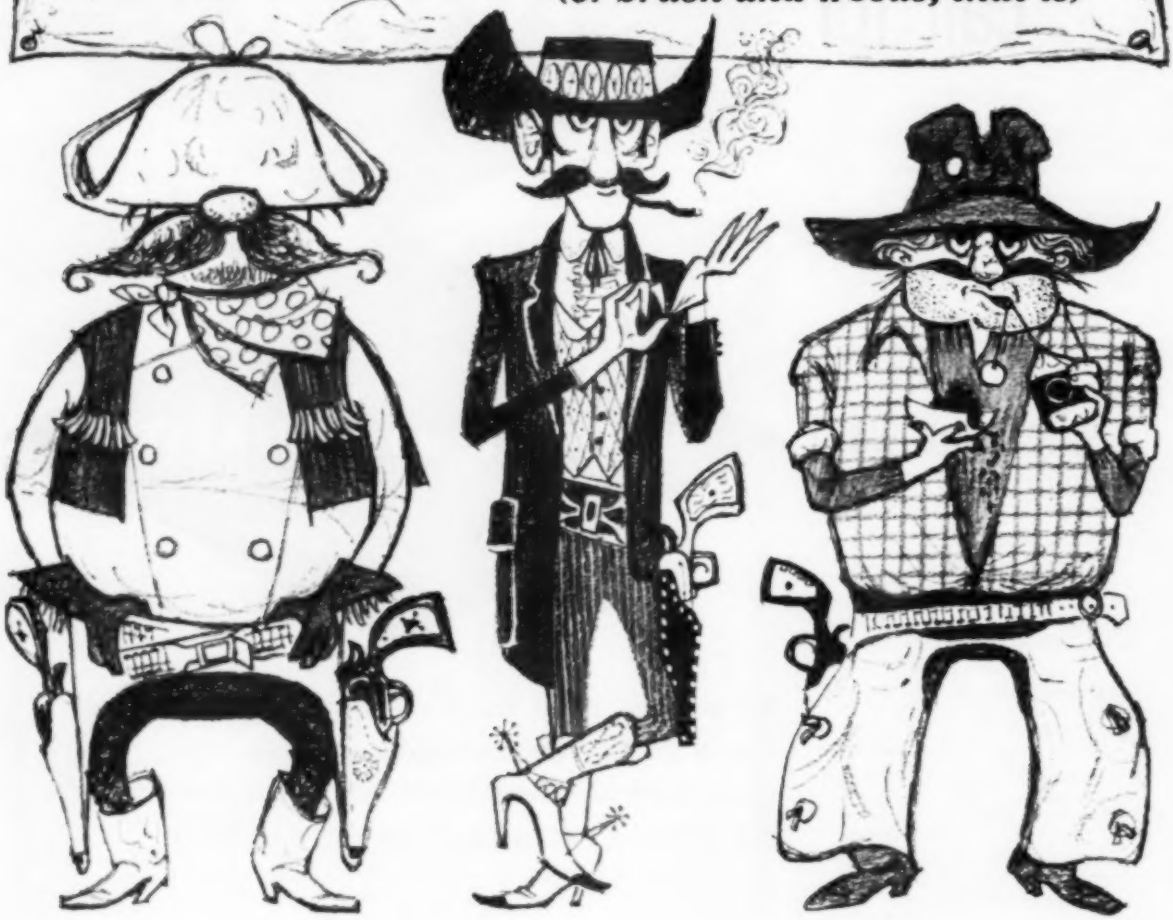
AMERICA'S 3 MOST "WANTED" KILLERS

(of brush and weeds, that is)



The "LINE RIDER"

Specializes in knocking off brush and weeds found along utility lines, railways and highways. Destroys mixed brush with 2-Ethyl Hexyl Ester formulations of 2,4-D and 2,4,5-T, and amine formulations in areas adjacent to sensitive crops.

The "FENCE RIDER"

Picks on isolated farm fence rows. Where volatility is no problem, uses the Butyl Ester formulations of 2,4-D and 2,4,5-T for economical kills of mixed brush. Attacks solid, resistant stands with higher acid formulations of 2,4,5-T. Low volatile formulations also available.

The "CROP RIDER"

He's the weed specialist. Favorite hunting grounds are grain fields and pastures. Seeks out weeds in oats, flax and rice with amine formulations. Boosts yields of corn and sorghums with Isopropyl Ester. Uses Butyl Ester for hard-to-kill perennials.

LINE RIDER, FENCE RIDER and CROP RIDER herbicides are available now in quantity for formulators and professional applicators. Write for complete technical data. Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.

Diamond Chemicals

Borate your Fertilizers...

adding boron boosts profits!

Borating your alfalfa fertilizer can mean bigger profits to you and your customers. Boron, a minor element, does major things for alfalfa. In fact, alfalfa responds so readily to boron that in some cases the yield actually doubles. Ample supplies of boron are so essential to profitable growth of alfalfa that most large producing states recommend *annual* applications. Each ton of alfalfa hay removed from the soil takes with it approximately 1.8 lbs. of borax — additional quantities are lost by leaching.

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Add boron! Add profit!

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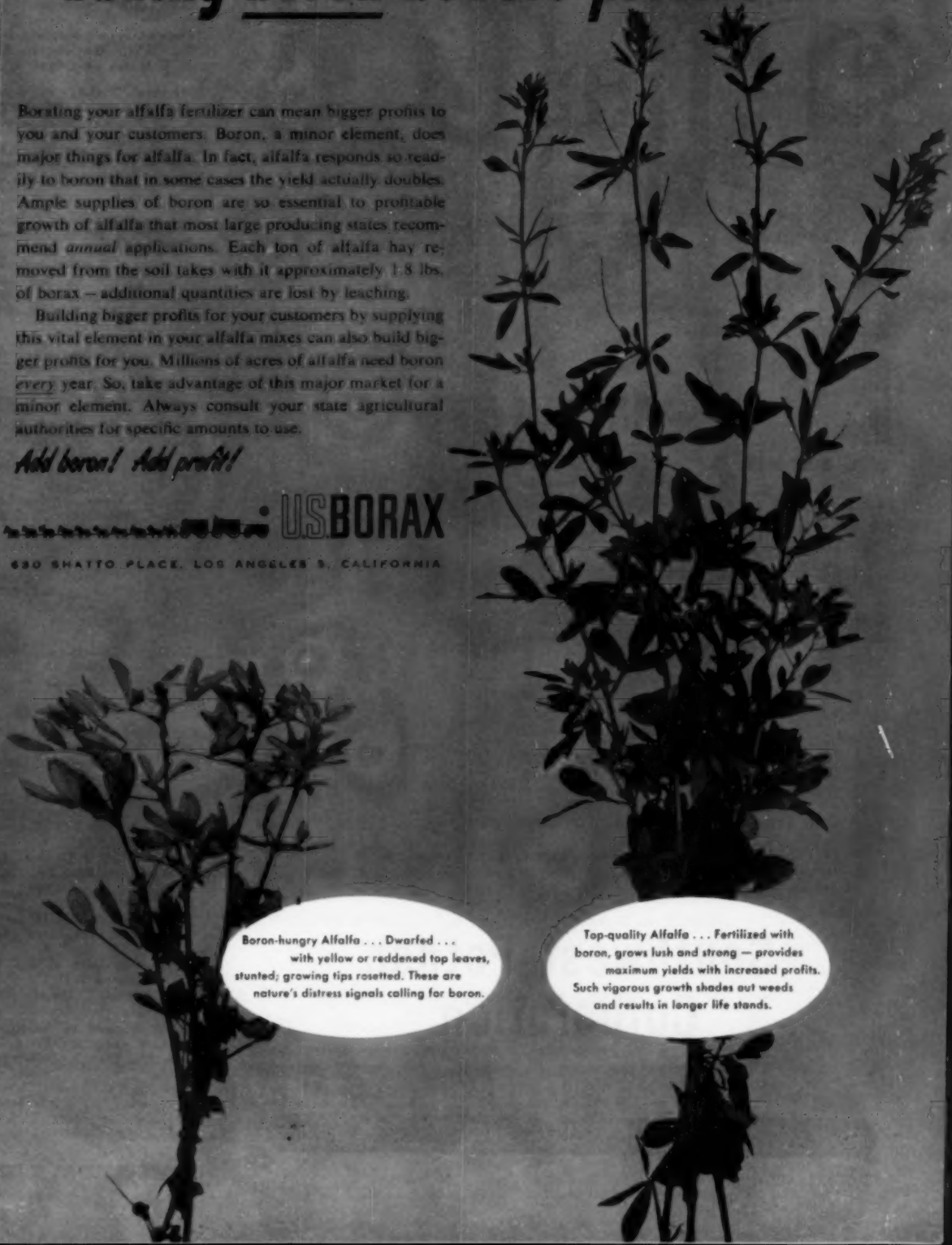

Boron-hungry Alfalfa . . . Dwarfed . . . with yellow or reddened top leaves, stunted; growing tips rosetted. These are nature's distress signals calling for boron.

Top-quality Alfalfa . . . Fertilized with boron, grows lush and strong — provides maximum yields with increased profits. Such vigorous growth shades out weeds and results in longer life stands.

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THIS symbol stands for high-grade uniform, coarse and granular Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

*Trade Mark

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Trade Listing

National Agricultural Chemicals Association. Association Building, 1145 19th St., N.W., Washington, D. C. Lea Hitchner, exec. sec.

National Plant Food Institute, 1700 K St., N.W., Washington, D. C. Paul Truitt, president.

American Potash Institute, 1102 16th St., N.W., Washington 6, D. C. H. B. Mann, president.

American Society of Agronomy, 2702 Monroe St., Madison, Wisc. L. G. Monthey, exec. sec.

American Phytopathological Society, S. E. A. McCallan, secretary, Boyce Thompson Institute, Yonkers, N. Y.

American Chemical Society, 1155 16th St., N. W., Washington, D. C.

Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C. William Horwitz, secretary-treasurer.

Agricultural Ammonia Institute, Hotel Claridge, Room 305, Memphis, Tenn. Jack Criswell, executive vice-president.

American Society of Agricultural Engineers, F. B. Lanham, secretary, 505 Pleasant St., St. Joseph, Mo.

Carolinas-Virginia Pesticide Formulators Association, 516 S. Salisbury St., Raleigh, N. C. Hugh Horn, secretary-treasurer.

California Fertilizer Association, Sidney Bierly, executive secretary, Room 213, Ochsner Building, 719 "K" Street, Sacramento, Calif.

Chemical Specialties Manufacturers Association, 50 East 41st St., New York City. Dr. H. W. Hamilton, secretary.

Entomological Society of America, 4603 Calvert Rd., College Park, Md. R. H. Nelson, secretary.

National Fertilizer Solutions Association, 2217 Tribune Tower, Chicago, Ill. M. F. Collie, secretary.

National Cotton Council, P. O. Box 9905, Memphis, Tenn.

Soil Science Society of America, 2702 Monroe St., Madison, Wisc. L. G. Monthey, exec. sec.

Sulphur Institute, 1725 K. St., N.W. Washington 6, D. C. Dr. Russell Coleman, president.

Weed Society of America, W. C. Shaw, secretary, Field Crops Research Branch, Beltsville, Md.

Western Agricultural Chemicals Association. Charles Barnard, executive secretary, 2466 Kenwood Ave., San Jose, Calif.

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This fully integrated plant has every facility for turning out every kind of multiwall bag ... open mouth or valve, sewn or pasted, stepped-end, and our own patented Kraft-lok® valve; also bags with special inserts, sleeves, protective linings or outers, and vapor barriers.

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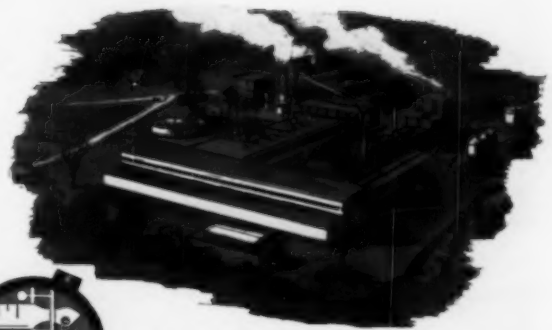
... and the best in open mouth bag filling machines is The Kraftpacker, for which we are exclusive sales agents.



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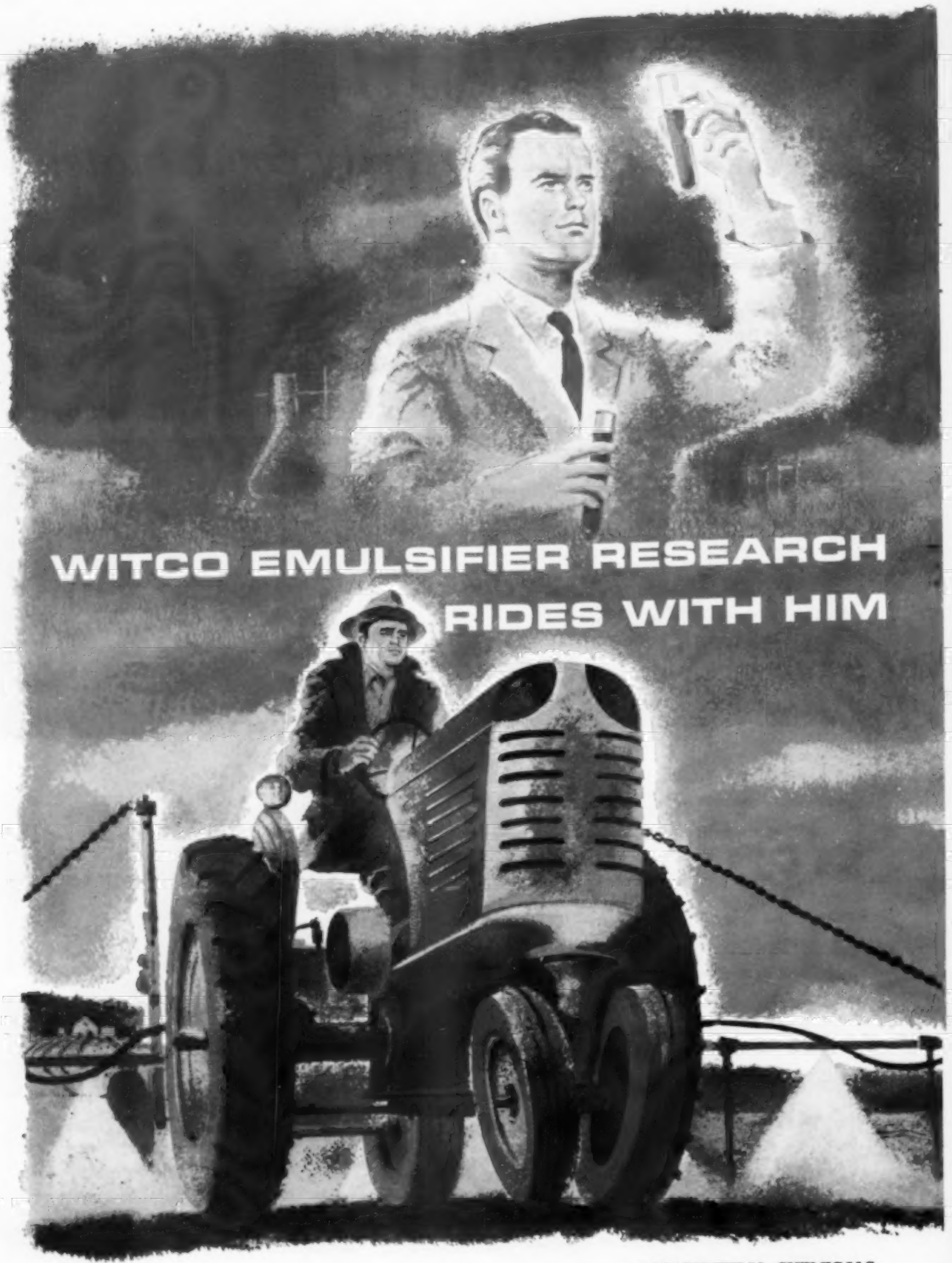
WITCO EMULSIFIER RESEARCH
RIDES WITH HIM

It's not yet Spring when Summer's work begins. Pre-emergence toxicants make possible an early start . . . a more profitable finish. And Witco research has created Witco Emcol Emulsifiers which perform outstandingly under the normal range of field temperatures. Formulators know how important this kind of performance is to sales.

Through the years, Witco research has made Emcol Emulsifiers increasingly attractive to formulators. Their excellent quality allows the use of reduced emulsifier levels. Their extreme versatility makes possible the use of but three Emcols to produce top-quality emulsifiable concentrates of a wide range of chlorinated hydrocarbon and organic phosphate toxicants. In addition, these emulsifiers produce concentrates which have excellent storage stability.

The many basic emulsifier patents held by Witco in more than 15 countries indicate the success of our research efforts in this ever-changing area of chemistry. Witco's technical service program makes available our extensive research facilities and highly trained specialists to help solve your formulating problems.

EMCOL	DESCRIPTION
H-300X H-500X	Emcol H-300X is balanced for toxicants in the lipophilic range (i.e., toxaphene and chlordane), while H-500X is ideal for more hydrophilic toxicants (i.e., DDT and BHC). Blends of this Emcol-matched pair produce superior emulsifiable concentrates with chlorinated hydrocarbon and organic phosphate insecticides.
H-710 H-712 H-714	Manufactured for use with 2,4-D and 2,4,5-T ester concentrates, at low levels, these products give low-foam concentrates outstanding emulsification and sludge-inhibiting properties.
H-140 H-141	Especially developed for use with Malathion, these Emcols may be blended with other Witco emulsifiers or used alone. H-140 produces excellent emulsifiable concentrates containing 5 pounds per gallon of Malathion (approx. 60% Malathion by weight). Emcol H-141 is recommended where levels of 8 pounds per gallon (approx. 86% Malathion by weight) are desired.
H-A H-B H-C	These unique Emcols make practical simultaneous application of a wide variety of liquid fertilizers—liquid pesticide mixtures. Such mixtures may be field-blended to give exactly the correct proportions of toxicant and fertilizer as well as correct dosages for particular crops.

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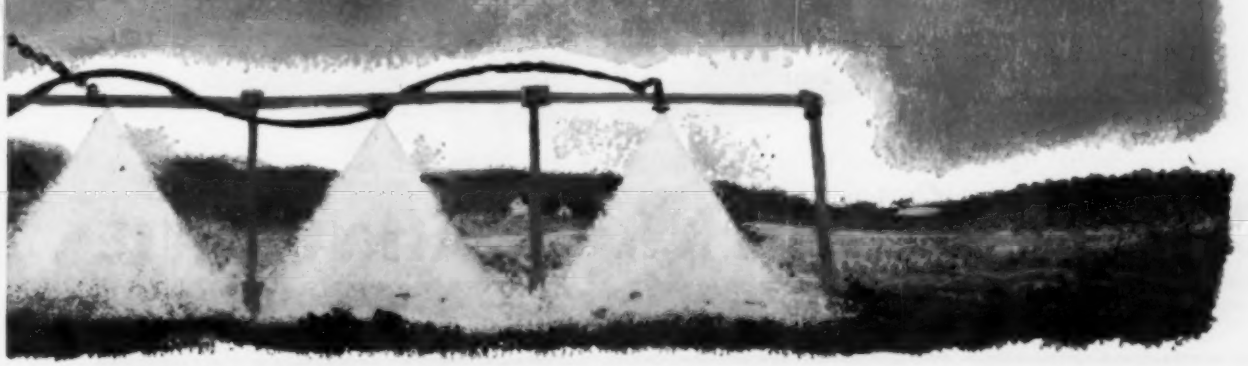
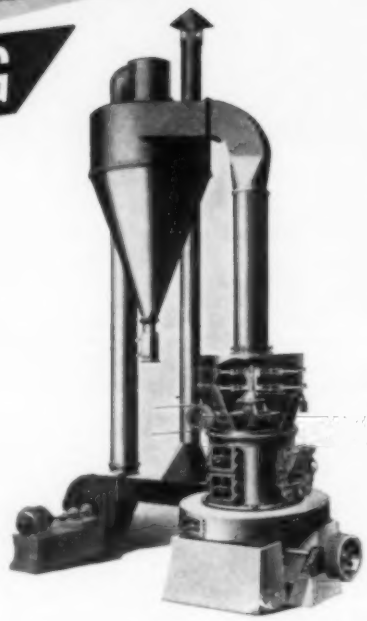


RAYMOND
offers a Full Line of Modern Mills for INSECTICIDE GRINDING



RAYMOND equipment is specially qualified for handling the wide range of pulverizing problems in the manufacture of modern insecticides.

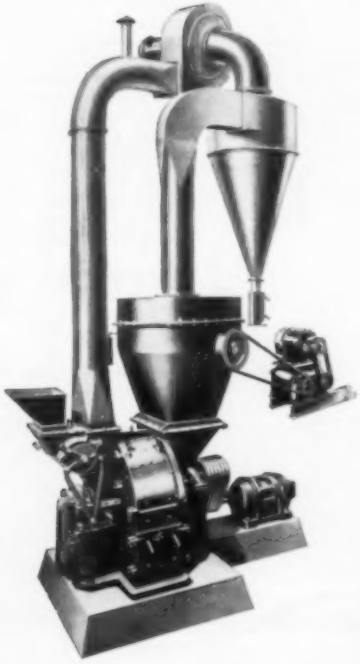
Three different types of Mills are available in various sizes for large or small plant capacities . . . and for today's many formulations.

Most all of the standard clay and fullers earth diluents, produced at high finenesses, are made on Raymond Roller Mills — the same is true for sulphur dusts, and sulphur bearing insecticides and many other materials.

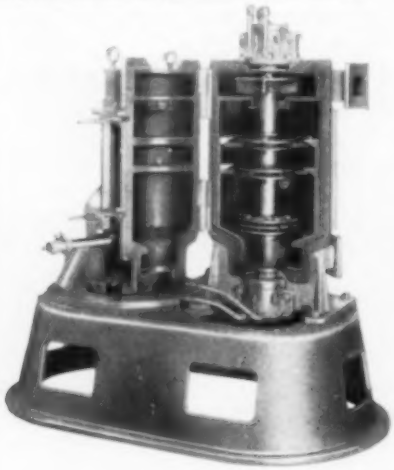
Major applications for Raymond Whizzer Imp Mills include the preparation of all common multi-component dusting formulations, direct from the technical material.

For high fineness products, Raymond Vertical Mills give excellent results at low costs, especially on concentrates of 50% or higher . . . delivering a uniform thoroughly blended finished material.

Tell us your product requirements . . . we will send you detailed information on the type of equipment you need.



Write for RAYMOND Bulletin #84-A. It describes details and applications of this equipment.



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Triangle Brand Copper Sulfate

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As Cyanamid's "walking giant" scoops away overburden covering a rich phosphate deposit, the surveyor plans a system that will handle the huge amount of water needed to make slurry and move it to washing and grading plants

HIS BUSINESS IS MAKING YOUR BUSINESS BETTER

Like all the men and women in Cyanamid's phosphate operation, his only business is phosphates for your mixed fertilizers

He's one of several hundred Cyanamid people who mine, process, research, deliver and service phosphatic materials for your acidulation and mixed fertilizer business. These people put Cyanamid's more than 40 years of phosphate experience into the kind of products and services you can use. Take advantage of both. Pick up your phone and call your Cyanamid representative.

Services you can use

Traffic Service: Cyanamid traffic specialists are ready to route and ship your orders without delays. Their knowledge can save you money and can make your operation run even more efficiently.

Technical Service: Cyanamid's staff of technical experts are on 24-hour alert. Often, what are new problems to you are solved problems to them. Make your formulation and production problems theirs. That's their job.

Sales Service: Cyanamid sales representatives are available to work with and for you in expanding present markets or in establishing new markets.

Products that serve: Cyanamid's only phosphate business is mining and manufacturing the highest quality products for your mixed fertilizer requirements.

- Florida Natural Phosphate Rock.
- TREBO-PHOS* — Triple Superphosphate.
- Phosphoric acid for acidulation.

To manufacture fertilizers that sell . . . mix with Cyanamid's phosphates and service.

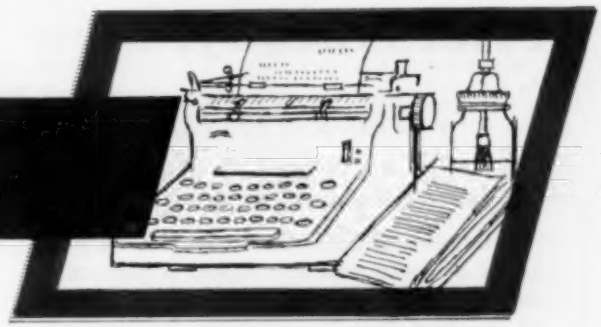
American Cyanamid Company, Agricultural Division, N. Y. 20, N. Y. **TREBO-PHOS is American Cyanamid Company's trademark for its triple superphosphate.*

CYANAMID

PHOSPHATE PRODUCTS

CYANAMID SERVES THE MAN WHO MAKES A BUSINESS OF AGRICULTURE

EDITORIALS



A STUDY of dealer and farmer attitudes toward use of agricultural chemicals has recently been completed by researchers at Iowa State University. Similar work has previously been done to determine what farmers and dealers think of fertilizers, and the contribution they can make to more efficient crop production, but this is the first time, so far as we can determine, that a similar study has been made in the ag chem field. And, we might add after seeing the findings, it is about time someone tried to find out what is running through the mind of the typical farmer and farm supply dealer when they think of pesticides, herbicides, soil fumigants, etc.

The findings are rather discouraging, to say the best. They indicate that only 14% of Iowa farmers use insecticide applications on their crops, and less than one out of three use soil insecticides. The record is substantially better for herbicides, which have been aggressively marketed in the state. Equally startling is the report that for at least half of the dealers interviewed agricultural chemicals contribute only one per cent or less to the dealer's annual sales volume. These figures are certainly disturbing, indicative as they are of the inadequate sales job that has been done in convincing either the dealer or the farmer that pesticides are an important fatcor in economical crop production. Still there is a bright side to the picture; if manufacturers of pesticides ever get around to making a major sales and marketing effort, it is obvious that today's sales totals can readily be doubled or tripled.

It was rather surprising to us to learn that these findings result, not from the joint efforts of the agricultural chemical industry to find out the facts, but rather from the decision of a single company to attempt to learn more about the market for its products. The resulting study is necessarily confined to a single area of the country. A much bigger job remains to be done in the study of the market for agricultural chemicals in other areas. Certainly this seems a project to which the whole industry should logically give its support.

IT is encouraging to hear that fertilizer manufacturers in the United States have joined with European producers in proposing a program to expand and improve the use of fertilizers in crop production throughout the world. The program would be financed with a $2 million fund, to be contributed by the manufacturers, and would be operated by the Food and Agricultural Organization of the United Nations. The FAO is responsible for some of the most beneficial and least publicized United Nations activities, not the least of which is the Freedom-from-Hunger campaign, of which the fertilizer program would be a part.

In the long run, of course, it makes more sense to export knowledge than materials. Many farmers around the world don't use fertilizer at all, or at least don't use optimum amounts for crop yields, so there is not much point in exporting fertilizers and fertilizer plants to undeveloped nations until the farmers themselves have received technical aid in using fertilizers properly. This is one problem the FAO intends to work on.

By helping countries develop national fertilizer programs, fertilizer manufacturers in the United States could be instrumental in solving

(*Continued on Page* 92)

Prices Steady, New Products Prominent In 1960 Pesticide Sales Picture

Producers of basic pesticides and formulators of these products report a generally satisfactory sales year in 1960. In spite of the fact that the growing season was late in getting under way in many areas, because of the severe winter, and despite midsummer drought in the Cotton Belt which sharply reduced insect populations, sales volume for the season was quite good. When pesticides were in demand, they moved in substantial volume.

Bright spots were the new record breaking sales of corn pesticides in the midwest corn belt, and the rapidly growing market for herbicides, particularly of the preemergence variety. Prices were reported generally as being more stable, indicating perhaps that the industry may be coming of age, or at least sales managers are showing an improved ability to forecast demand,—and to adjust supply to it.

Several apparent trends can be drawn from the reports received by "Agricultural Chemicals" from the following group of industry leaders. There seems to have been a continuation of the swing from dusts to sprays. The phosphates have done well this season, as a natural selection of those who fear residue problems yet have to treat near harvest date. The unfavorable publicity which the industry received before the season opened had no apparent effect in reducing demand, indicating that the farmer is more impressed by an effective product than he is by newspaper headlines. Combination products are growing in popularity. On a geographical basis, the biggest gainer this season was the midwest, where the demand for pesticides to protect corn set new records. The far west was the weakest area, as compared with previous year's sales totals.

Quite a number of new products were successfully introduced. The developers report satisfactory distribution was obtained, and the new materials generally seemed to be finding a place for themselves. The full details follow:

IVOR R. BURDEN
Executive Vice President
United-Heckathorn
Richmond, Calif.

Drift Policies Create Low Sales Volume In West

Volume of ag chemical sales in the West was lower than in 1959. This was particularly evident in the Pacific Northwest fruit areas and on Arizona cotton. In California sales have been running only slightly below normal. In general, low sales could be accounted for by low insect population. However, lower volume could also be attributed to the confusion created by stricter policing of drift of residue pesticides

1960 saw a rapid swing to use of sprays over dusts, and particularly to short residual organic phosphate insecticides and miticides. Malathion was used on cotton for lygus and

(Continued on Page 104)

Improved Pest Control Habits Evident In Southwest

ALBERT F. FUCHS
Atlas Agricultural Chemicals
Waynesboro, Ga.

The 1960 insect control season in the southeast (I am speaking primarily of cotton) followed the trend of the last few years, with increased usage of the "newer" chemicals, greater number of applications and at higher rates of active ingredient per application. The farmer educational program is making steady headway, and more farmers are following an intelligent program of pest control than ever before. The result has been better control, therefore, greater yields and

(Continued on Page 104)

Higher Pesticide Prices Likely, Due to Controls

M. E. WIERENGA
Vice-President and Mgr.,
Marketing Dept.,
California Spray-Chemical
Corp.

As a result of the Miller Bill the pesticide industry now faces far more stringent controls on the use of its products than it did previously. As a result, costs have risen sharply in the areas of research, development and marketing. It appears inevitable that higher prices must result for pesticidal chemicals, — such price increases being the natural result of the increased and more complex services which pesticide pro-

(Continued on Page 104)

JAMES J. LAWLER
Sales Manager
Shell Chemical Company

Volume Favorable Despite Late Start Of Season

The 1960 pesticide sales season was late in getting started, due to severe winter weather. Abnormal snows in the Midwest and Southeast, plus an extended rainy season in the Far West, curtailed seasonal farm operations. In the Cotton South, extended drought conditions shortening the growing season and low populations of insects reduced the anticipated off-take in cotton pesticides. Nevertheless, the period during which sales occurred was highly active and resulted in a favorable volume.

Lower corn parities and the removal of acreage restrictions plus a successful 1959 harvest brought about a record breaking corn soil insect market in the corn belt.

(Continued on Page 104)

Supplies Ample Despite Minor, Local Shortages

Pesticide sales got off to a late start in 1960 due to the long, stubborn winter, which delayed planting and other cultural practices. There were minor reductions in acreages, and yields will be lower on some crops due to severe spring frost. There were no major crop disasters, however, and, except for the late start, growing conditions were quite normal over most of the nation.

Insect and disease infestations have been quite normal. There were no serious major outbreaks to place unusually heavy demands on supplies, except for local situations.

While prices have been uniformly low, dumping of excess inventories was not evident to the extent that the total market was seriously affected. Apparently the industry is

(Continued on Page 90)

S. H. BEAR
Division Manager
Niagara Chemical Division, FMC

H. E. JOHNSON
President
Triangle Chemical Company
Macon, Ga.

Liquid Insecticide Volume Up, Dusts Steady

In general the insecticide business in Georgia this past season could be termed quite satisfactory. There was a decided increase in the volume of liquid insecticides sold, while business on dusts held steady. Pricewise, the entire line held reasonably steady, although profit margins were not all that might be desired.

We experienced a big increase in demand for methyl parathion this season, particularly in mixtures with DDT, Toxaphene-DDT and Endrin. By contrast there was a slight decline in BHC volume, and a big decline in the volume of Endrin sold. We sold only minor amounts of Aldrin formulations this season.

Lack Of Insects Causes Disappointing Season

What was generally calculated early in the year to be an excellent pesticide season turned out to be somewhat less than fair. Sales generally were off due to the simple fact that there was a short population of insect pests.

In a number of areas, weather was especially favorable to insect predators, thus insect populations were held to a minimum. It is well known that, in some crop areas where normally the agricultural producer is accustomed to regularly scheduled spray applications, a number of applications were skipped this year. On the other hand, during early spraying many areas suffered extremely dry weather and this too was responsible for low insect populations.

(Continued on Page 104)

W. SCOTT JAMES
Advertising Manager
Chemagro Corporation
Richmond, Va.

CHARLES SIVERD
General Manager, Agricultural Division
American Cyanamid Company

Acceptance Of New Products Aids Sales Volume

During the 1960 growing season we experienced an excellent demand for Cyanamid pesticides. Several new products, including Thimet and Cyprex, were successfully introduced and helped to expand our sales volume. Also, as a result of receiving acceptance of thirty-five new claims for malathion formulations we were able to expand our market for this product which has been selling in big volume since 1952. Prices, we found, were more stable than in previous years.

The farmer is a sound dollar man and will use good products when he feels that they give him an economic return

(Continued on Page 89)

Late Sales Compensate For Slow Start Of Season

Agricultural pesticides sales started very slowly in the Midwest this year due to a late spring. Movement of material to dealers started about 20 days later than normal. Sales in April, May and June, however, were ahead of the comparable 1959 period, making up for lower volume in the early Spring. In July, movement in the North Central states compared favorably with 1959 volume, but in the South Central area demand was well below the 1959 level.

Pre-emergence herbicides moved in large volume, along with soil insecticides, and accounted for the large percentage of sales in late April, May and early part of June. Customer reaction to pre-emergence herbicides has been good, and we expect 1961 sales to be excellent on these products.

Prices were generally lower this year than last on all pesticides. If our sales and profit by the end of the season are close to 1959, we will feel fortunate. The predicted "soaring 60's" have not yet developed in the Agricultural Chemical business.

ROBERT THOMPSON
President
Thompson-Hayward Chemical Company
Kansas City, Mo.

W. R. PEELE
President
W. R. Peele Company
Raleigh, N. C.

Satisfactory Growing Conditions Helpful In Southeast

The 1960 season has been very satisfactory; rainfall adequate; insect infestation about normal. Farmers use more insecticides and take better care of their crops when they have a good growing season.

Combination insecticide formulations have become very popular in the south east, and growers feel they get better control with them. Of course, every time we add another formulation to the already too-long list, we have more problems, such as inventory control, registrations, etc.

(Continued on Page 104)

ADDITIONAL COMMENTS BY INDUSTRY LEADERS APPEAR ON PAGES 89 & 90

MOLYBDENUM

AS A MICRONUTRIENT IN PLANT GROWTH

Research on use of molybdenum in crop production has confirmed the commercial importance of this element as a crop nutrient. Soils most likely to respond to molybdenum treatment are those that have been highly leached, such as the coastal sands and hill country soils, heavily cropped soils, and alkaline soils in areas of heavy rainfall.

Alfalfa, peas, peanuts, soybeans, lettuce, and spinach are among crops responding favorably to molybdenum treatment. Estimates for 1960 indicate that U.S. farmers boosted legume output by some 20 million pounds through molybdenum treatment (total legume acreage for 1960 in the U. S. is reported to have been about 60 million acres).

FIELD tests, actual experience, and an expenditure of more than $200,000 by one company in research at some 16 colleges and universities over the past eight years has brought molybdenum to the forefront among agricultural trace elements.

Molybdenum is the most recent arrival among the micronutrient elements to have commercial agricultural significance, the damage to crops caused by its deficiency having been discovered only some 20 years ago.

For a while, it appeared that information on molybdenum nutrition of plants might remain interesting knowledge, but of no practical importance in the business of growing crops.

In 1942, however, A. J. Anderson of Australia conducted a series of field tests which demonstrated that some low-producing, hill-side clover pastures near Adelaide, South Australia, were molybdenum deficient. Soil applications of only 1/16 ounce per acre were all that was needed to correct the deficiency.

Anderson showed that the principal effect of molybdenum was to enable the symbiotic bacteria living in nodules of clover roots to perform their normal function of fixing atmospheric nitrogen. His work introduced a profitable new idea in associating these symbiotic organisms with molybdenum supplies. It is this interdependence between legumes and nitrogen-fixing micro-organisms that has provided the greatest outlet for molybdenum as a practical agricultural chemical.

Considerable research on the use of molybdenum in crop production has been conducted in the past decade—and much more is in progress.

Washington State University, which contributed recently to seed treatment development, has engaged in one of the most active molybdenum research programs, and continues to be active in this field. Other universities and colleges currently pursuing comprehensive studies on agricultural molybdenum include: Purdue University, University of Wisconsin, Cornell University, Oregon State University, and Rutgers University.

These studies concern themselves with many different crops and soil types. In Georgia, for example, the State University, after exhaustive tests, has recommended the use of molybdenum for alfalfa crops. In addition, experiments have been in progress to study the effect of molybdenum on peanut production. Although definite conclusions have not been reached regarding peanuts, results appear promising and warrant further investigation.

Other recent research findings of interest came from greenhouse experiments at Michigan State University, where five organic soils have responded to molybdenum treatment for lettuce and spinach growing.

The potentially important commercial breakthrough in this 10-year research program came in 1955 when Dr. H. M. Reisenauer, Washington Agricultural Experiment Station, conducted a series of studies in which he applied molybdenum in increments from 2 ounces to 16 pounds per acre of dry seed pea crops on the Couse soils of northeastern Washington. He found that one pound of molybdenum in conjunction with the sulphur contained in 99 pounds of

gypsum provided optimum plant nutrient efficiency.

In 1956, about 8,000 acres of dry seed peas were treated with this mixture and more than 100,000 acres were so treated in 1957. Farmers of Palouse County of eastern Washington found amazing results. In some cases, the increased yield was as high as 400 pounds per acre. A typical increase on a 100-acre pea crop was 24,000 pounds, which meant about $1,200 more in income to the farmer.

Carrying his experiments further, however, Dr. Reisenauer found that only ½ ounce of molybdenum per acre would be needed to achieve the same or better results if the molybdenum were applied directly to the seed, rather than as a fertilizer mixture.

Molybdenum can be applied to aid plant growth in three ways:

1. **Seed treatment**
2. **Fertilizer additive**
3. **Foliar spray**

To meet this requirement, Climax Molybdenum Company developed Moly-Gro Seed Treatment (R) and made it available to farmers in 1958. That year, in addition to markets already established, several hundred progressive growers in the states of Illinois and Missouri treated more than 8,000 acres of soybeans with Moly-Gro. Of the farmers who reported their test results, 46 per cent showed an average increase in soybean yield of 3.2 bushels per acre. There was no evidence of depressed yields.

This year, over 5,000 growers in this two state area have nearly 400,000 acres of molybdenum-treated soybeans under cultivation, and that total is expected to exceed 1,200,000 acres in 1961 – roughly 20 per cent of all soybean acreage planted in these two states.

In applying the new seed treatment, growers buy 20-acre cans of Moly-Gro at a cost of less than 35¢ per acre. At present prices, the higher yield can mean a return of almost $10 for every dollar invested in the new treatment.

Containing a highly effective adhesive compound, the new material adheres to the soybean seed, providing a uniform coating which won't rub or wipe off during planting or handling.

Moly-Gro Seed Treatment may well be the answer to one of the most puzzling problems facing agronomists—why are soybean yields affected so little by conventional fertilization? With most crops, agronomists can write a prescription making use of known factors which will increase yields substantially the first year it is applied.

This is not the case with soybeans. However, molybdenum might very well be the first major breakthrough in increasing soybean yields through the use of supplemental plant nutrients.

The gradual increase in soybean yields—19.8 bushels per acre in 1939 to only 24.5 bushels per acre in 1959 – was due largely to varietal improvements and not fertilizing practices.

The need to solve this problem is imperative. Demand for soybeans has jumped phenomenally—from 4,000,000 acres in 1939 to almost 24,000,000 acres in 1959. Moreover, the export market is growing in importance, representing about 25 to 30 per cent, or around $250 million annually.

To retain this market, domestic producers must continue to produce soybeans at a competitive price. A definite threat looms in the Far East. Red China already produces more than two-thirds as much as the United States, and is continuing to expand, mostly in Manchuria. There is every reason to believe that Red China is getting ready to take dead aim on our Japanese market which currently takes about 30 per cent of our total exports.

Seed treatment, of course, is not practical for established perennial legume stands. For such crops, Climax Molybdenum Company has developed a fertilizer additive and a foliar spray. The seed treatment is, however, the most efficient way to apply molybdenum when annuals or new stands of perennials are being established.

Molybdenum can, therefore, be applied to aid plant growth in three ways:

1. *Seed Treatment* where ½ ounce of molybdenum per acre of legumes is applied directly to the seed required to plant one acre. This material contains a minimum of 38 per cent molybdenum.
2. *Fertilizer Additive* where a specially screened (minus-20, plus-80 mesh) compound containing a minimum of 47½ per cent molybdenum is blended easily with other dry fertilizers or inert carriers. This compound is relatively insoluble in water, however, the molybdenum content is completely available for plant uptake at a constant rate throughout the entire growing season.
3. *Foliar Spray* where a crystalline powder, completely soluble in water and containing a minimum of 39 per cent molybdenum, is added to liquid fertilizer or water to spray foliar and citrus crops.

A disease in citrus trees is being controlled with molybdenum used in the spray form. Yellow spot, a troublesome and costly problem to Florida citrus growers, is generally first observed early in the summer when water-soaked areas begin to appear on the leaves. A short time later, large yellow

(*Continued on Page 99*)

National Agricultural Chemicals Association

will review safe use of pesticides and their important contribution to food supplies and world health

BENEFITS of pesticides in food production, — with emphasis on safe use of pesticides . . . is the general theme of discussions scheduled for the annual meeting of the National Agricultural Chemicals Association to be held September 27, 28 and 29 at the del Coronado Hotel, Coronado, Calif.

Hardin B. Jones of the Donner Laboratory of Medical Physics, will discuss "The Reasonable and the False Issues of Carcinogenicity," while Alfred Boyce, University of California, will follow with a report entitled "Pesticide Safety Makes Sense." The opening session closes with USDA's Henry Van Zile Hyde reviewing "Pesticides—Vital to World Health" and the Hon. Jamie L. Whitten, congressman from Mississippi, speaking on "Chemicals and the Food Supply."

The general committee for the 1960 meeting includes: chairman, Paul Ekberg, Monsanto Chemical Co.; Howard J. Grady, California Spray Chemical Corp.; Richard H. Wellman, Union Carbide Chemicals Company; J. Drake Watson, Pennsalt Chemicals Corp.; and Ivor R. Burden, United-Heckathorn.

NAC PROGRAM SUMMARY

Tuesday, September 27 . . . Meeting Called to Order by J. P. Ekberg, Monsanto Chemical Co., General Commitee Chairman
Presidential Address . . . Jack V. Vernon, NAC president
Reasonable and the False Issues of Carcinogenicity, Hardin B. Jones, University of California
Pesticide Safety Makes Sense . . . Alfred M. Boyce
Pesticides Vital to World Health . . . Henry Van Zile Hyde
NAC in Action
Chemicals and the Food Supply . . . Hon. Jamie L. Whitten
Panel Discussion, *Public Relations in the Sixties* . . . Jack Dreessen, Moderator; George K. Johnson, Walter Erikson, Jack T. Pickett, and Donald G. Lerch.
NAC Staff Forum
Reception for Members and Guests
Wednesday, September 28: Annual Banquet
Thursday, September 29: Committee Meetings

NAC President
Jack V. Vernon
Food Machinery & Chemical Corp.
New York, N. Y.

Hon. Jamie L. Whitten
Congressman from Mississippi
Washington, D. C.

Hardin B. Jones
Donner Laboratory of Medical Physics
University of California
Berkeley, Calif.

Alfred M. Boyce
director, Citrus Experiment Station
University of California
Riverside, Calif.

Henry Van Zile Hyde
chief, Div. of International Health
Public Health Service
U. S. Dept. of Health, Education and Welfare,
Washington, D. C.

Jack Dreessen
NAC Association
Washington, D. C.

Walter Erikson
president, Natl. Association Television and Radio
Fresno, Calif.

Jack T. Pickett
editor *California Farmer*
San Francisco, Calif.

Phosphorus Termed Essential To Growth of Potatoes

An indispensable food element in the growth of the potato plant, and in the development of top quality tubers, is phosphorus. Researchers have found that despite any phosphorus residues in the soil, the potato crop responds significantly to additional amounts of applied fertilizer phosphorus. The early stage of growth, when normal, rapid growth of vine occurs, is highly critical with reference to phosphorus supply. Relatively large quantities of this plant food are essential to the metabolic process of producing starch in the tubers.

by Vincent Sauchelli
Consultant Agronomist
Baltimore, Md.

NEGLECT phosphorus and you slash your profits. That's the conclusion drawn from a fascinating, scientific study* made by Dr. G. V. C. Houghland, U. S. plant physiologist, who has devoted more years to the investigation of potato growing problems then he cares to admit. (Technical readers are advised to consult the original published report for details.)

I have a special interest in this research conducted doggedly by this scientist for several years despite harassing obstacles. Results of research in plant physiology problems by a German scientist attracted my attention and I translated the report for publication in *Agricultural Chemicals* issue of November 1956. In this article appeared this statement:

"Carbohydrates can enter into the metabolism of plants only by way of the carbohydrate-phosphoric acid esters. If as the result of phosphorus deficiency the carbohydrates cannot be made use of, the plants stop building up secondary substances and may also lack energy for chemical synthesis and growth."

Dr. Houghland pondered that observation. He determined to see if it held good in the case of the potato plant. The results of his long, painstaking investigation amply confirmed it. Phosphorus is indispensable in the growth of the potato plant and in the development of quality tubers, particularly in the early stages of growth and development. To produce starch in the tubers, the job the potato plant is required to do, the phosphorus applied in the fertilizer has, according to Dr. Houghland, "significance far beyond that heretofore recognized . . . . . (The results show) why potato yields can be expected to increase when a readily available form of phosphorus is applied to soils well supplied with residual phosphorus."

Residual Soil Phosphorus

Among the numerous observations made by Dr. Houghland, the following highlights are selected as pertinent to this brief digest of his work.

In recent years, agronomists at several state agricultural experiment stations have been teaching that phosphorus is less critical in potato growing than nitrogen or potassium. Perhaps such an attitude is generated by the fact that the potato plant absorbs relatively less amounts of phosphorus than either of these other elements:- about 15 per cent of the applied fertilizer phosphorus is absorbed, as compared with about 80 per cent of the nitrogen and about 50 per cent of the potassium in the fertilizer. Thus, about 85 per cent of the applied phosphorus is absorbed by soil agencies and held as a reserve. Furthermore, all the fertilizer phosphorus in the vines is returned to the soil; only about 7 per cent of the applied phosphorus being lost through the tubers themselves.

The surprising fact, readily proved by researchers,* is that despite the phosphorus residues in

*The influence of phosphorus on the growth and physiology of the potato plant. *American Potato Journal*. April 1960. Vol. 37. No. 4. pp. 127-138.

*W. L. Nelson, A Hawkins Research Rpt. No. 79 U.S.D.A. Soil & Water Conservation Res. Div. 1946.

the soil, the potato crop responds significantly to additional amounts of applied fertilizer phosphorus.

These scientist said: "It is interesting that even on soils high in amounts of accumulated phosphorus there is a response from applied P_2O_5 in both Maine and North Carolina."

Dr. Houghland designed an experiment to determine: (1) the reasons for this response to applied phosphorus and (2) to study the influence of phosphorus in the physiology of the plant and its manufacture of starch.

The experiment was carried out in the greenhouse under approved, orthodox procedures, which included the use of nutrient solutions in which exact control could be exercized on the number and amount of all required plant nutrients. The Cherokee variety of potato was used.

This design was based on the assumption that the time at which phosphorus is made accessible to the plant, and the amount may both influence the yield of tubers.

At the start, one series of plants was treated with a solution, *minus phosphorus*, for a period of 50 days. A second series had the same treatment for 70 days. Then after the 50 and the 70 day period respectively, the first series of plants was treated with the nutrient solution plus 63 parts per million (ppm) of phosphorus; the second series with 21 ppm of phosphorus. The check or control series received 63 ppm of phosphorus for 112 days.

For the non-technical reader, we may dispense with details and point out briefly the pertinent deductions from the experiment:

The plants grown for 50 days without phosphorus in the nutrient solution showed definite symptoms of phosphorus deficiency, namely, a smaller number of and shorter length of tuber stolons and fewer roots. The Cherokee variety normally will develop a heavy set of potatoes which apparently depends upon an adequate and timely supply of phosphorus.

After receiving 21 ppm phosphorus for 22 days following the 50- and 70-day no-phosphorus treatments the favorable effect was much more pronounced in the 50-day than in the 70-day series.

The movement of phosphorus from the vine to the tubers was strikingly shown in these tests. After 50 days minus phosphorus, the vines contained 57% of the total phosphorus and the tubers, 32 per cent. Then, given the solution containing 63 ppm phosphorus for 58 days, the vines showed a content of 15%, and the tubers, 83% phosphorus.

At the end of the 70-day no-phosphorus treatment, the vines contained 41% of the phosphorus and the tubers 51%. Then, following a phosphorus feeding for a period of 45 days, vines contained 31%, tubes 65% of the phosphorus. Although these plants were 115 days old, they were less mature than the 112-day control plants, which had 9% of the total phosphorus in the vines and 83% in the tubers.

These results emphasize how important it is that the plant have an adequate, readily available supply of phosphorus in its seedling stage. This is the same observation investigators have made in the case of corn and other food plants. Phosphorus stimulates root growth when they are small, and this in turn stimulates stem and leaf growth; then these promote more root growth and so the cycle continues in an expanding form.

What would happen, reasoned Dr. Houghland, if he treated the plants reversely; that is, supply the first 50 or 70-day series with phosphorus during the first 50- or 70-day test period; then withhold phosphorus after these stated periods for different lengths of time. These are the results:

	Total phosphorus in Vines %	Tubers %
63 ppm P for 50 days	66	23
No P for 30 days	22	74
No P for 55 days	7	92
63 ppm P for 70 days	43	51
No P for 20 days	19	79
No P for 38 days	6	93
63 ppm P for 112 days (Control)	9	83

Conclusion

This experiment shows conclusively that phosphorus is an indispensable food element in the nourishment of the potato plant. The phosphorus must be readily available and placed where the young rootlets can use it advantageously. The early stage of growth when normal, rapid growth of vine occurs, is highly critical with reference to a phosphorus supply. Relatively large quantities of phosphorus must be available to the metabolic process of producing starch in the tubers. This was convincingly demonstrated by the composition of tubers in the 50-day old plants which contained only 23% of the total plant phosphorus while the tubers of the control, 112 days old, contained 83 per cent.

The results reported by the German plant physiologist about the influence of the carbohydrate-phosphoric acid esters was strikingly confirmed by Dr. Houghland's investigation.★★

Phosphorus stimulates root growth when plants are small and this, in turn, stimulates stem and leaf growth. These then promote more root growth and the cycle continues in an expanding form.

Value of New and Old Chemicals Reviewed for Washington Fruit Growers

Northwest growers and orchardists touring fruit producing areas in eastern Washington report on results with new (and old) pesticides. Three new products of the Bayer laboratories in Germany are said to be proving effective against pear psylla and in control of European red mites. Kelthane, Tedion or chlorobenzilate also are effective against this pest in summer sprays.

Tree fruit experts advise that Sequestrene as well as an iron lignin sulfonate control iron deficiency symptoms at comparable costs. A new Monsanto product, "Stop-Scald" was reported to be effective in control of storage scald on three varieties of apples. Most effective application is dipping, but this involves investment in dipping tanks and fruit elevators. FDA tolerance on the compound is 3 ppm.

by Loren H. Milliman

"SEVIN is more positive as an apple thinner than any other material tried in more than 200 treatments in two hemispheres," according to Dr. L. P. Batjer, USDA principal physiologist, Wenatchee, Wash., who probably has conducted more experiments over a wider area on apple thinning than anyone else. Last year Dr. Batjer went to Australia to compress two seasons' trials into one year's time.

Speaking at different gatherings of orchardists during the annual tours sponsored by Washington State University and the Washington State Horticultural Association, Dr. Batjer revealed that further experiments with Sevin will be conducted.

About the same amount of thinning is obtained three or four weeks after full bloom as results from earlier application of the insecticide. After that time, Sevin's thinning action drops rapidly, and there is no danger of thinning from using the insect-killer in the second cover spray, Dr. Batjer indicated.

Approximately 2,000 growers participated in the tours of fruit-producing areas in eastern Washington that continued until Aug. 12 after starting July 26 in Okanogan county (which, incidentally, is larger than some New England states).

In his experiments with Sevin in Australia, Dr. Batjer learned that the material thinned every variety on which it was tried. On some varieties, at least, the insecticide apparently kills the seed in the apple.

There is no need for additives with Sevin, according to Dr. Batjer, who also reported that there was no evidence of phytotoxicity when Sevin was used. The fact that the material is a good thinner at least three weeks after full bloom gives the orchardist an opportunity to see what kind of crop his trees are carrying before the thinning operation is undertaken.

However, not all growers who used Sevin this spring as a combination insecticide and apple thinner were pleased with the results, Dr. Batjer reported. Of 14 growers with whom he discussed results following their experiments, half thought the thinning achieved was just right, and half thought too much thinning resulted.

The latter result was noticed particularly on various strains of the Delicious variety, especially on lower branches which were shaded, and on the inner portions of the tree.

A. T. Dally, Tieton route 1, whose orchard was one of those visited on the tour, declared that he never again would use Sevin as a thinner on Delicious in a cold year. "I feel it cost me quite a little," was his comment.

"This label cost the manufacturer about $3 million," declared Dr. Stanley C. Hoyt, assistant entomologist at the Washington State University tree fruit experiment station in Wenatchee, "yet most growers fail to read it."

His address during the 20th annual field day at the experiment station, part of the orchard tour program, varied from the usual one presented by entomologists because, as he explained, "the bugs are so well under control this year we don't need to discuss the matter."

However, Edward W. Anthon, entomologist at the experiment station, warned that the present tendency toward ever more restrictive laws can produce long-range results harmful to the general public.

"The public is entitled to both high standards of insect control and high standards of safety in control procedures," Mr. Anthon declared. "However, we should not lose sight of the fact that an entomologist can be shackled with laws to the point that he loses the initiative to try new things.

"He also can be burdened down with obtaining legal clearances to carry on his work to the extent that he loses sight of his objective to control harmful insects so that man can obtain food and fiber of good quality which is free of harmful residues."

Mr. Anthon brought out this point in urging growers to stay with control programs which had proved effective, because "there are only a few effective compounds left, and very few to use in the near future. Therefore, it becomes our problem to see that a control program which will last longer and do the best job is placed in the hands of the grower."

New insecticides which show promise for control of pear psylla in tests this year include Dimethoate, Phosphamidon, and three new materials from Bayer laboratories in Germany, according to Dr. Everett C. Burts, assistant entomologist at the tree fruit experiment station.

Pear psylla continues to be the most damaging and expensive to control of the various pear pests, Dr. Burts added. A pre-bloom and two post-bloom sprays are generally required each year to keep this pest under control. The cool spring and early summer experienced in the Pacific Northwest this year were ideal for psylla development.

However, a quick change to high temperature accompanied by extremely low humidity the first two weeks of July dried up large numbers of psylla. This type of weather was ideal for many of the mites, Dr. Burts pointed out, and they are doing serious damage where control measures are inadequate.

The products of the Bayer laboratories in Germany which are effective against pear psylla also control European red mites, he added. Kelthane, Tedion or chlorobenzilate are also effective against this pest in summer sprays.

Blister mites in Bartlett pear leaves can be controlled with 2 pounds of Diazinon WP per 100 gallons applied between Sept. 1 and 15, according to Dr. Burts.

Although Sevin insecticide reportedly is effective as an apple thinner, its use for that purpose is meeting with resistance on the part of some growers in the state of Washington who feel that too much thinning results.

Use of various agricultural chemicals to control deficiency symptoms in orchards was outlined by Dr. Nels R. Benson, tree fruit experiment station soil scientist and horticulturist. Geigy's Sequestrin 138 Fe at the rate of 1 pound per 100 gallons of spray applied two or three weeks after full bloom and again about three weeks later corrects iron deficiency symptoms.

A product of some of the paper mills, iron lignin sulfonate, used at the rate of 10 to 15 pounds per 100 gallons of water and applied in three sprays, has the same effect. The total costs are about the same according to Dr. Benson. There seems to be a carry-over effect, with trees growing more normally the second season.

"You get more for your money with a spray rather than a ground application," Dr. Benson commented in reply to a question as to how the materials can best be applied.

Early sprays of lime sulfur, or sometimes Cyprex, followed by Captan, Cyprex, or Phygon resulted in good control of apple scab in orchards in northern Washington, Dr. Roderick Sprague, tree fruit experiment station plant pathologist, reported.

Availability of Cyprex for use as a summer spray at the rate of 5 ppm one week before harvest, permitted a partial cleanup of heavy leaf infections. Captan proved helpful, but where d'Anjou pears were interplanted, its use was limited. Any history of oil in the season's schedule also precluded use of Captan.

Compatibility tests which were conducted in July on Jonathan apples and d'Anjou pears showed that Cyprex plus Solubor was safe on Jonathans and caused only a few leaf tip burns on the pears. Previously, Cyprex and Guthion proved compatible, as well as Cyprex with either parathion or malathion.

In rare instances when drying conditions were slow, Cyprex and DDT caused slight leaf injury, according to Dr. Sprague. He advised against the triple and quadruple mixtures. Any triple mixture including Solubor is to be viewed with caution, he added.

To protect fruit in "scabby" orchards from pinpoint scab this fall. Dr. Sprague suggested a spray or dust with Ziram, Cyprex or Captan in early September, plus another, depending on rains, applied later.

"Another scab spray, General Chemical's 2466, shows promise as it is fairly effective and safe," Dr. Sprague declared.

Captan rates "very good;" Ziram and Maneb, "good," and Cyprex, "fair to fair plus," under controlled experimental conditions in ability to check bull's eye rot, he reported. Continued trials with various materials using commercial field sprays and handling have produced some completely confusing results.

A good sticker should be used with Captan, Dr. Sprague added. Where that material cannot be used, "your next best bet is a Ziram liquid or dust," he went on, "unless scab is a major problem. Ziram is a good protectant against both scab and the rots if fruit is covered ahead of September and October rains."

(*Continued on Page* 100)

Agricultural Chemicals: Farmer Attitudes And Use Patterns

The agricultural chemicals industry's interest and "stake" in optimum farmer use of agricultural chemicals is without question the most important "common cause" uniting such groups as manufacturers, formulators, distributors, farmers and educational institutions.

This first set of quantifiable data, regarding farmer attitudes toward use of agricultural chemicals shows that only 14% of Iowa farmers use crop insecticides, —87% on the other hand use weed killers, and 30% use soil insecticides.

"No farmer" used all of the six categories of agricultural chemicals studied: crop insecticides, soil insecticides, brush killers, grass killers, grain fumigants and weed killers.

ONLY 14 PER CENT OF IOWA FARMERS USED CROP INSECTICIDES IN 1957

George M. Beal, Joe M. Bohlen and Daryl J. Hobbs[1]

Rural Sociologists
Iowa State University

THE economic rationale for the use of agricultural chemicals as an important and profitable input in the farming operation is well established—whether they be used for such things as weeds and grasses, or soil and crop insects. Yet, most farmers are not using agricultural chemicals in their farming operation to anywhere near the optimum level. Why?

The answer to this "why" question is complex. Many farmers lack basic understanding about agricultural chemicals, their economic potential, how to apply them and what their specific uses are. In many cases, farmers have negative attitudes toward the use of chemicals. Some farmers have had bad experiences with agriculture chemicals in the past—mainly because of not understanding the specific purposes for which certain products are designed, or not using them properly. In some cases, the farmer has received inadequate or inaccurate advice on the use of chemicals.

Many individuals and groups have a stake in the optimum farmer use of agricultural chemicals; groups such as farmers, educational institutions and agencies, chemical manufacturers, formulators, distributors, dealers and salesmen. While each of these groups has its own unique set of problems, all of them also have many problems in common. One interest that all of these groups should have in common is obtaining optimum farmer use of agricultural chemicals. However, to date there seems to be little data regarding farmer attitudes toward and patterns of use of agricultural chemicals. While it is recognized that these attitudes and patterns of use will vary from farmer to farmer, from state to state and by region, a recent statewide farmer study in Iowa provides specific data for this corn-belt state and may provide insights for other states and regions as well.

The Iowa Study

The data from which this report is written are taken from one phase of Iowa State University Agricultural Experiment Station Project No. 1320, a cooperative project with the Dow Chemical Company. These data were collected by personal interview with a random sample of 315 Iowa farmers, who were farming more than 40 acres. The interviews were taken in the summer of 1958. Data were collected on agricultural chemical use for the years 1955, 1956, 1957 and part of 1958. Data were collected on six categories of agricultural chemicals; weed killers, grass killers, soil insecticides, crop insecticides, brush killers and grain fumigants.

Farmer Patterns of Use

Use—Non-use

Ninety-two percent of the farmers used some agricultural

[1]Data in this paper are from Iowa State University Experiment Station Project No. 1320 conducted in cooperation with the Dow Chemical Company. The project is under the co-leadership of George M. Beal and Joe M. Bohlen, Professors of Rural Sociology, Department of Economics and Sociology, Iowa State University. The phase of the project reported here is under the supervision of Graduate Assistant Daryl J. Hobbs.

chemicals of the above six categories in 1957. Twenty-three percent used agricultural chemicals *exclusively* on yards, ditches, fencerows and roadsides, while the remaining 69 percent used agricultural chemicals on field crops. Many of the latter groups also used chemicals on yards, ditches, fencerows and roadsides.

Use by Category

If the percent of farmers using chemicals in 1957 in each category is analyzed, the following results are obtained:

Weed killers	87 percent
Soil insecticides	30 percent
Brush killers	19 percent
Crop insecticides	14 percent
Grass killers	4 percent
Grain fumigants	4 percent

Thirty-three percent used only one of the above categories of agricultural chemicals, 34 percent used two categories of agricultural chemicals, 18 percent used three categories, six percent used four, and less than one percent used five categories. No farmer used all six categories. The average number of categories used for the sample was 1.85.

Area Covered

Does the use of agricultural chemicals seem to be extensive—on a large number of acres—or mainly used on certain fields or for "spot" use? The average number of acres in crops for the farmers interviewed was approximately 175 acres.

Weed killers

Forty-six percent of those who used weed killers used them on less than 25 acres. Thirteen percent used weed killers only on fencerows, ditches and roads. Another 18 percent stated they used weed killers only on spot field applications. On the average, weed killers were applied to 33 acres.

Soil insecticides

Twenty-nine percent of those who used soil insecticides used them on less than 25 acres. Thirty-nine percent used them on from 25 to 49 acres. The average application was on 46 acres.

Crop insecticides

Twenty-nine percent of those who used crop insecticides used them on less than 25 acres. Fifty-seven percent used them on between 25 and 100 acres. The average was 49 acres.

Grass killers

Sixty-four percent of those using grass killers used them on less than ten acres. Twenty-one percent stated that they used grass killers only on fencerows, ditches and roads. The fact that 20 percent did not know on how many acres they applied grass killers is a further indication that grass killers are being used mainly for spot field use and on ditches, fencerows, yards, and roadsides. The average per farm application for those using grass killers was eight acres. It may be noted that only four percent of the sample had used grass killers at the time of the study.

Continuity of Use

The continuity of use, and the recency with which farmers have tried certain chemicals for the first time, may be helpful in determining where farmers are in relation to the trial or adoption stage. In the data presented in Table 1, the use of agricultural chemicals for the years 1955 to 1957, inclusive, is considered. Thus the percentages of farmers using the several categories of agricultural chemicals will differ from the previously reported data which were only for the year 1957. An additional note may be added on the interpretation of data from Table 1. The percentages in the last three columns are percentages of those using the given category of chemicals any time during the years 1955-1957,—or, in other words, a percent of the first column. Thus, as an analysis is made of the weed killer data, we find that 281 farmers, or 89 percent of the sample, had used weed killers sometime during the period 1955-56-57. Of these 281 farmers, 244 farmers, or 86 percent had used weed killers all three years, 1955-56-57. Eleven percent had used them for the first time in 1957. Three percent had used weed killers in 1955 or 1956, but did not use them in 1957. This would indicate a relatively high continuity of use. On the other hand, the pattern of

(*Continued on Page* 91)

Part II of This Report on Farmers' Attitudes Towards Pesticide Products will Appear In The October Issue

Table 1. Continuity of Agricultural Chemical Use

Category of Chemical	Number and percent of farmers using category any time 1955-57		Of those using the chemical: Number and percent using* for first time in 1957		Number and percent who* used in 1955 or 1956 but not in 1957		Number and percent who* used in all three years — 1955-57	
	No.	%	No.	%	No.	%	No.	%
Weed killers	281	89	30	11	7	3	244	86
Soil insecticides	110	35	37	34	16	14	57	52
Crop insecticides	83	26	18	22	39	47	26	31
Brush killers	80	25	22	27	20	25	38	48
Grass killers	14	5	12	86	2	14	0	0
Grain fumigants	17	5	3	18	6	35	8	47

*These percentages are based on numbers using specific categories of chemicals anytime during period 1955-57, i.e. numbers in column 1.

Dow Uses Survey Findings To Help Build Pesticide Sales

Dow Chemical Co. reports big increase in sale of agricultural chemicals over ten year period during which marketing has been handled through Agricultural Chemicals Division, with sales emphasis on Dow trade marked products. A cooperative advertising program with dealers is an important feature of the Dow marketing program.

Results of a survey designed to show dealers how to sell more Dow products were featured at a recent marketing conference. The survey emphasized the very positive role the dealer plays in influencing farmers to buy agricultural chemicals.

SALES EMPHASIS PLACED ON DOW-TRADEMARKED PRODUCTS

IT has long been generally recognized in the agricultural pesticide field not only that agricultural chemical dealers are relatively uninformed about the industry's products, but also that these products seldom make any important contribution to building the dealer's total sales volume. For these two very understandable reasons dealers generally do very little to promote the sales of agricultural pesticides, and make little effort to learn much about them. While these attitudes have long been recognized, there has been no way to pin point the exact situation,—no way that is until those two well-known rural sociologists, Joseph Bohlen and George Beal of Iowa State University, who have made similar studies in the fertilizer industry, recently completed a survey of dealers attitudes toward, and knowledge of, agricultural chemicals (as distinct from fertilizer).

In their study they confirmed that, at least in the case of fifty per cent of the Iowa dealers surveyed, agricultural pesticides contributed only 1% or less to the dealer's dollar volume of sales. (The survey was limited to Iowa, and the findings would not necessarily be true for other areas.) To a substantial number of the balance of the dealer group, sales of pesticides amounted to only 2 to 5% of total sales.

The dealers who participated in the survey included hardware and farm implement dealers, feed-and-grain marketers and operators of grain elevators. The Iowa State investigators soon learned that essentially none of the dealer group interviewed made any serious effort to promote the sale of agricultural insecticides, fungicides, herbicides, etc. Many of them, incidentally, *thought* they were actively promoting sale of these products, but actually in two-thirds of the stores visited the interviewers were unable to find any displays for such products or other promotional materials. This, in spite of the fact that volume of business has grown so substantially over the past ten or fifteen years that the value of the agricultural pesticides sold annually is now estimated in the neighborhood of six or seven hundred million dollars (at the price to the consumer). In general the dealer knows little about agricultural pesticides, thinks of them as "low volume" specialty products, and too often simply does not wish to be bothered with them.

Concurrent with the *dealer* survey the Iowa researchers also conducted a study of *farmers'* buying attitudes and preferences. In general the use of agricultural chemicals by Iowa farmers was disclosed to be "limited in scale, number of products and expenditures." The most widely used product proved to be herbicides, which 87% of the Iowa farmers who were surveyed reported using. Only 19% of the reporting farmers, however, indicated that they buy and use brush killers. Only 30% use soil insecticides, and only 14% use crop insecticides.

One fact definitely established in the study was that the recommendation of the dealer, or at least the particular brand or brands of farm chemical products he carries, is a highly important factor in determining what product the farmer will buy. Seventy-seven per cent of the farmers surveyed advised that they seek the advice of their dealer before deciding what to buy. Seventy-nine per cent said they would switch brands if their dealer did. Only fourteen per cent of the farmers interviewed indica-

ted that they were strongly enough sold on the present brand of their choice so that they would switch dealers if necessary to get that particular brand.

There is considerably more detail to the study, but up to this point, not all the data has yet been released. *Agricultural Chemicals* is privileged to publish some of the findings from the farmer survey in the preceding article in this issue (pages 38 and 39).

The Bohlen and Beal survey on fertilizers, a summary of which was published in the July issue of *Agricultural Chemicals* (pages 34-36) was made possible by a grant from TVA. The agricultural chemicals survey was aided by a grant from Dow Chemical Company, and the first disclosure of the Bohlen and Beal findings on the agricultural chemical market came at a marketing conference for Dow dealers held last November in Midland, Mich., Dow's home office.

Dow markets its line of 70 agricultural pesticides through approximately 10,000 dealers. Products include Dowpon herbicides and brush killers, Korlan insecticide and a line of soil and grain fumigants. Dow's efforts to aid its dealer group to sell more of the Dow pesticides have been built around a program of cooperative advertising in local newspapers, paid for by Dow, but carrying the name of the dealer and timed by him for maximum influence on his local market. The program is reported to have helped materially in increasing sales of Dow agricultural pesticides from $30 million to $45 million annually between 1955 and 1959.

The Dow marketing conference last winter was the first one held. In preparation for the conference the Dow ag. chemical department arranged with Iowa State to have the dealer and farmer survey conducted, and featured results of the survey in its program at the conference designed to show dealers how to sell more Dow products. Some details of the survey, as well as a review of the sales record of the Dow Agricultural Chemicals Division, were made public in an article in the April 15, 1960, issue of *Sales Management*.

Up until 1950 Dow Chemical Co. sold most of its agricultural chemicals in bulk, a substantial percentage through formulators to be marketed under private brands. A separate Agricultural Chemicals Division was set up in 1950, and the sales emphasis was rapidly switched to Dow trademarked products sold through a wide dealer organization. Sales have expanded four times in the ten year period since the division was set up, according to W. W. Allen, agricultural sales manager. The list of dealers, currently at 10,000, has expanded by 1,500 since the spring of 1959. Approximately 6,000 of these dealers participate in the Dow-financed cooperative advertising program.

The article in *Sales Management* quotes Clyde A. Bryant, merchandising manager of the ag division, as saying: "Dealers are stocking one-third more of Dow products than they did a year ago. We're getting higher quality, interested dealers who are really ready to make an entity of their agricultural chemicals line. Such dealers get ample rewards for engaging in our program, and we have pegged minimum orders for participation high enough to keep out the sleepers."

Dow reports that it spends a million dollars a year on the cooperative advertising program for the ag division. The space runs in 4,000 local regional and state farm publications, dealer newspapers, etc., and is reenforced by spot radio and TV campaigns on a regional basis designed to break at the time local farm problems with crop pests, weeds, etc. are giving concern, and to offer advice in solving them.

To participate in the "Business Building Program" a Dow dealer must order at least ten units from his distributor. (A unit is one case or one 5-gal. drum of a product). In the 1959 program, built around Dowpon grass killer, the dealer received with a ten unit

(Continued on Page 92)

1960 SALES AIDS FOR YOU

This booklet contains 52 new advertising mats available for your use in local newspapers. Each of these 1960 mats will do a powerful selling job on your customers. As you page through this book, notice that each Dow agricultural chemical has been classified by type of product—making it easy for you to quickly find the ads promoting your local market conditions. **SEE PAGE 19 FOR ADDITIONAL SALES AIDS available from The Dow Chemical Company.**

3 FREE ADS in your local newspaper

Based upon your order of Dow Agricultural Chemicals, you are assured of having three free ads inserted at no cost to you in your local paid-circulation newspaper. One of these ads will be Ad No. 5940—shown on the opposite page. This ad offers the Free Samples of Dowpon. The other two ads which you select should reflect the products which you order. Further explanation will be provided by the salesman contacting you.

LOCAL ADVERTISING identifies YOU as the headquarters for DOW products

The use of these advertising mats in your local newspaper not only identifies you as the local source of Dow products but ties-in with the state, regional and national advertising being carried in your customer's favorite farm publication. Plan to advertise the Dow products you are now ordering—it will pay off in additional sales and extra store traffic for you.

The facsimile at right is typical of Dow's 1960 dealer sales aids. Dow dealers may qualify for free advertising in local newspapers in proportion to their purchases.

Green Lake, Wisc., Aug. 31

Developments in Plant Disease Control Outlined at Phytopathological Meeting

Notable research developments in plant disease control covered at the annual meeting of the American Phytopathological Society include reports on new pesticides, fungicides, and virus diseases.

Among new diseases for which cures are being sought are; alternaria rot of apples, an unidentified pear tree root rot, and yellow dwarf virus disease.

TWO new experimental fungicides were announced by Hercules Powder Company, Wilmington, Del., at the annual meeting of the American Phytopathological Society held August 29-31 at Green Lake, Wisc. The chemicals, currently designated by the experimental numbers 3944 and 4223, are both chlorinated organic sulfur compounds, which show particular promise as protective seed treatments for cotton, peanuts, corn, and other vegetables, —and as soil treatment for cotton. They are also thought to have disease control value when applied as sprays to plant foliage.

Reporting on the two chemicals, Hercules plant pathologist E. Neil Pelletier remarked specifically on their potential for broad usefulness. His greenhouse evaluation of the two materials showed these results: Applied to the soil, they provide good control of the soil-rotting organisms that attack cotton seedlings. Compound 3944 proved better than three commercial standards, resulting in seedling emergence and stands of 90 per cent when applied at an effective rate to the soil. In seed treatment tests, 3944 proved as effective as two standard commercial fungicides tested as protectants of corn and cucumbers, and was superior on peas and peanuts.

Field trials conducted at the Clemson College Truck Crop Experiment Station proved 4223 to be the best of six materials tested as an all-purpose vegetable seed treatment. Compound 3944 was as good as other effective commercial materials. Field evaluation of 3944 in regional interstate cotton seed treatment tests also was encouraging, said Mr. Pelletier.

The Hercules scientist also commented on the safe handling advantages of these two new chemicals. Hazard to warm blooded animals has proved extremely low, whether the chemical is taken into the stomach, the lungs, or applied to the skin.

Organic Fungicides for Avocado

Experimental successes with two organic fungicides, Dexon and Shell SD 4741, were announced by George A. Zentmyer and J. D. Gilpatrick, both of the University of California. If field trials now underway bear out these early results, the two scientists believe that avocado growers may be able to prevent root rot or cure cases of early infection by applying the chemical to tree roots in irrigation water. Both chemicals were completely effective in protecting Mexican avocado seedlings from disease although they were planted in rot-infested soil.

Studies indicated the most effective treatments were Dexon at the rate of 20 parts per million of soil, and for SD 4741, 50 and 100 ppm. Chemically, Dexon is p-dimethylaminobenzenediazo sodium sulfonate; SD 4741, O,O,O-trimethyl phosphorothioate.

New Disease Threat in Midwest

A new disease threat to the apple orchards of the Midwest was revealed by two University of Illinois plant pathologists.

Unknown in orchards until only two years ago, the apple disease – alternaria rot – recently has been infecting apples growing in Missouri, Illinois, and Indiana. Infection ran as high as one apple in three.

Bill G. Tweedy and Dwight Powell of the University of Illinois' Department of Plant Pathology found the disease infecting only Jonathan variety apples, each fruit developing two to three black spots a quarter of an inch in diameter and an eighth of an inch deep.

- **Hercules announces new fungicides 3944 and 4223**
- **Dexon and Shell SD suggested for root rot of avocado**
- **New disease threat to apple orchards in Midwest**
- **Tomato disease not effectively controlled by calcium spray**
- **EN 18133 controls sting nematodes and increases peanut yields**
- **Thimet, Di-Syston and EN 18133 effective on Lily Bulbs**
- **Unidentified root rot attacks pear trees in Oregon**
- **New virus disease of legumes identified in Washington**
- **Liming reduces threat of tomato disease**

The plant pathologists learned this year that fungicides normally used by growers to control orchard diseases, are not effective against alternaria rot. Since the fungus which causes the rot apparently abounds in orchards, they consider the disease to represent a distinct threat to many apple growers until an adequate control can be discovered.

Tomato Disease Not Controlled

Use of calcium or molybdenum sprays on tomatoes reduces blossom end rot, but results in more cull fruit, according to two Louisiana State University plant pathologists. J. B. Sinclair and R. T. Brown, who carried forward three years of intensive field trials at a Louisiana experiment station which highlighted the significance of preliminary evidence that calcium lowers blossom end rot losses. Their experimental results showed that the chemical sprays effectively reduced blossom end rot in only one of the three test years. In two of the years, sprays caused an increase in cull fruit and a decrease in marketable tomatoes.

Nematode Control in Legumes, Citrus

Several discussions at the meeting dealt with control of nematodes. Three North Carolina State College plant pathologists, J. N. Sasser, W. E. Cooper, and T. G. Bowery, reported that use of effective chemicals to control sting nematodes can increase peanut yields by three to four times. Good results were obtained with broadcast treatments of a new experimental non-volatile nematocide, EN 18133, and with soil injections of the volatile chemical, 1,2,-dibromo-3-chloropropane. The three Carolina investigators indicated that these chemicals did a good job whether applied before planting, at planting time, or six weeks after peanuts were planted. Treating after planting was somewhat less effective than the other two methods,—such a practice does have the advantage of allowing growers a chance to save their crop when nematode infestations are discovered after the crop is started.

Alfalfa growers in the Middle Atlantic States are probably losing a big part of their product to root lesion nematodes, according to research findings of G. J. Stessel, University of Rhode Island. This root feeding pest is widespread throughout the soil of the area.

The most effective fumigant, —1,2,-dibromo-3-chloropropane, reduced root lesion nematode population by 77.1 per cent. Alfalfa grown on this treated soil yielded 17 per cent more than alfalfa grown on a similar but untreated field. With less effective soil fumigants, alfalfa yields increased less.

A. S. Tarjan, Florida Agricultural Experiment Station, suggested strongly the removal of trees as a method of eradicating the burrowing nematode from Florida citrus groves. Proof that burrowing nematodes cannot survive more than six months in the absence of living citrus roots lends additional support to this method of control. This species of nematode is the cause of spreading decline, a malady that threatens Florida's citrus production.

Nematode Control on Lily Bulbs

New organic chemicals, dusted on bulbs or applied as granules in the planting furrow, may help Oregon lily growers stop the ravages of root lesion nematodes. Experiments with phosphorodithioate compounds, conducted by Harold J. Jensen and Donald E. Konicke, Oregon State College plant pathologists, hold considerable promise toward this goal.

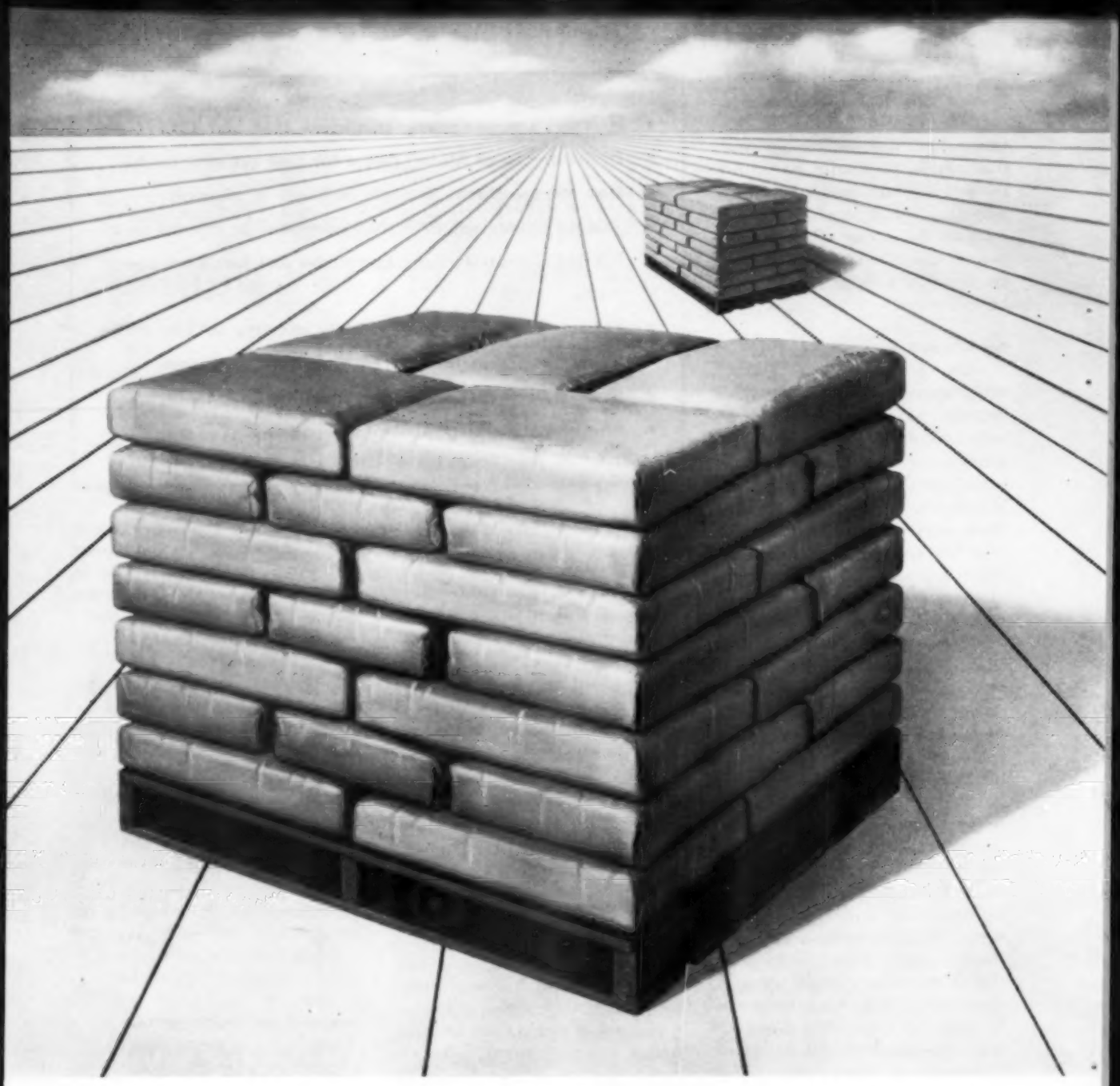
The research team noted that effective treatments reduced nematode populations by 90 per cent or more. Treated plants grew normally, produced more bulblets, and developed vigorous root systems. The treatments apparently caused slight yellowing of leaf tips, both of treated lily plants and those grown from resulting bulbs.

Specific chemicals used by Dr. Jensen and Mr. Konicke were Thimet, Di-Syston, and an experimental material, E. N. 18,133.

Unidentified Rot Attacks Pear Trees

A root rot not previously known to attack pear trees is apparently a major cause of the rapid decline now affecting many orchard trees in the Rogue River Valley of Oregon. Research reported by H. Ronald Cameron, Oregon State College, shows that the same soil-borne fungus which causes root rot of avocado is responsible for much of the pear sickness in Oregon. In tests with one-year old Bartlett pear seedlings, inoculation of the root tips with the fungus caused them to turn brown and

(Continued on Page 94)



Stack better...pack better...close tighter!

ST. REGIS* PASTED VALVE BAGS give you an all-around saving of time and money because they . . .

STACK BETTER—Take up less room on the warehouse floor, because squared ends allow them to be stacked and stored snugly together. PACK BETTER—Easier to hang on the filling tubes of packers. Operators use less waste motion . . . and there's less waste due to spillage. CLOSE TIGHTER—Since the ends are securely pasted together, they form a tighter valve closure than sewn valve bags. Less siftage, more protection. LOOK BRIGHTER—With six flat surfaces, there's plenty of room to imprint your name and product information *big*, *bold* and *bright*.

St. Regis Stepped End Type Pasted Valve Bags are now available with new, improved Capcote* PE lining—to give you more moisture protection at *less* cost.

The money-saving Pasted Valve Bag is an example of St. Regis *Packaging-in-Depth* in action—a complete bag service available from 13 manufacturing plants and 33 sales offices across the country. For complete details, call the Bag Division representative in your area!

*Trademark

Packaging-in-Depth by BAG DIVISION **St.Regis** PAPER COMPANY

Knowledge of Potential Hazards Essential to Fertilizer Plant Safety

One of the greatest factors and indicators of good safety practices in a fertilizer plant is good housekeeping. Preventing disorder is a management job. In addition, men should be informed of safety problems and should know what to do when warning signals appear.

THE lack of specialized equipment in the liquid fertilizer industry is a major reason for accidents in fertilizer plants, Elmer Perrine, Allied Chemical Corp., told the Northeastern Regional School on Accident Prevention in Fertilizer Plants, Aug. 10 and 11 at the Park Sheraton Hotel in New York. Mr. Perrine is chairman of the Fertilizer Section of the National Safety Council.

Equipment in use today either was designed for other industries or was designed for the fertilizer industry of years ago, he said. This, however, is being corrected, Mr. Perrine pointed out, as manufacturers of heavy equipment now are beginning to keep pace with the increasing complexity of liquid fertilizer manufacture. Mr. Perrine's topic was "The Handling of Liquid Materials in the Fertilizer Mixing Program." He said that an understanding of what can go wrong with equipment is necessary to safety.

When the hazards are known, he continued, precautions can be taken. Maintenance and continuous inspection of equipment are vital to a plant safety program, Mr. Perrine pointed out. For instance, he said, even corrosion-proof pipes sometimes fail because of such factors as abrasion or change of formula. Welding and cutting can cause explosions and poor ventilation can create fire hazards. In addition, he said, dangerous gases sometimes can be created in the manufacture of liquid fertilizers.

Personnel should be given a healthy respect for the material they are handling, Mr. Perrine declared. Acids, urea, and ammonium nitrate in themselves are not particularly hazardous, he continued, but, when misused, they can be very dangerous.

Mr. Perrine called for careful supervision of men working in liquid fertilizer plants. Men should be informed, he said, of safety problems—where each hazard lies, how it can be overcome, and what to do when warning signals appear. Among the warning signals cited by Mr. Perrine were excessive steaming and unusually dry or sticky materials being produced. Inspection of fertilizer that has been produced, he said, can show if something is wrong somewhere in the system.

One of the greatest factors and indicators of good safety practices in a plant is good housekeeping, Ed. O. Burroughs Jr., F. S. Royster Guano Co., told the supervisory personnel attending the school. Mr. Burroughs described poor housekeeping conditions that actually exist in fertilizer plants, and that can be avoided.

General good housekeeping and appearance, he said, are an important factor in mental guidance of the workers. Preventing disorder, he continued, is a management job. Mr. Burroughs pointed out that plants frequently must be closed down in order to be cleaned up and valuable production time is lost when good housekeeping is not observed habitually.

A program of good housekeeping should start with the plant superintendent, he said, and should work through the supervisors to the men in the plant. The superintendent, Mr. Burroughs said, must set the tone for the housekeeping in the plant. A good housekeeping program, he added, pays off.

William C. Creel, North Carolina Department of Labor, said that every fertilizer plant should keep some type of accident records to show how many accidents occur and where and how they happen. An accurate first aid log, for instance, will show if there is an accident problem in a plant.

Unsafe acts and unsafe conditions are the cause of all accidents, Mr. Creel said and he listed four steps to be taken in eliminating unsafe acts. They are: good working conditions, a safe plant (guards on machines), a planned safety program, and supervisory safety training. To determine unsafe conditions, a supervisor must have a planned procedure for plant inspection. "You can't just look around," he said. If a hazard is discovered, the correction can be found, Mr. Creel declared.

The purpose of accident investigation is to discover how the

(Continued on Page 93)

How Hercules helps promote better insecticide usage

To help farmers throughout the Cotton Belt understand the advantages of a planned, season long insect control program based on toxaphene, educational advertisements such as these are currently appearing in the leading farm publications.

Reaching more than two million readers monthly, they help the farmer get the most from his insecticide dollar, increase confidence in insecticides and result in improved sales for dealers.

Agricultural Chemicals Division
Naval Stores Department
HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

NR60-6

TOXAPHENE

Increasing the Efficiency of Fertilizer Bagging Operations

Suppliers of bags and bagging equipment often operate special departments which conduct complete packaging and handling studies for customers and provide helpful suggestions for improving packaging operations.

Such a department is operated by Union Bag-Camp Paper Corp. and its services include the facilities of a complete design and art department which will redesign and/or create a new design for the customer's bags.

IN analyzing production operations at fertilizer plants, technical service engineers for Union Bag-Camp Paper Corp. have observed that, in the average fertilizer plant, probably more labor is involved in the bagging operation than at any other stage of manufacturing fertilizer.

With mounting labor costs and higher prices on bagging materials, it is no wonder that cost-minded fertilizer manufacturers are making every effort to introduce higher economies and efficiencies into the bagging operation wherever possible. In this effort, they have the assistance of the manufacturers of bags and bagging equipment, who, through long experience with all types of bagging installations, often are able to make extremely useful suggestions, following a study of specific installations.

Many suppliers of bags and bagging equipment operate special departments which study bagging problems and offer suggestions for improving packaging operations. Such a department is operated by Union Bag-Camp Paper Corp., New York, which offers its customers (and prospective customers) a "packaging efficiency plan." This plan includes a study of the buyer's bag design; specification control; bag construction; packaging machinery survey; and a study of materials handling throughout the user's plant.

Typical of the recommendations which have resulted from some of their studies are the following case histories:

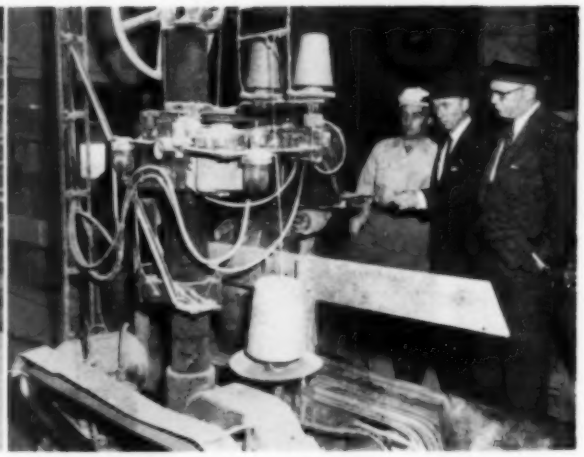
A versatile filling unit, such as the Union I & C Bagger shown here, provides flexibility in bagging different types and package size units of fertilizer without time-consuming change-over.

Smith Douglass Co.

OVER a seven month period, Union Bag packaging engineers studied operations at Smith Douglass' six plants in Norfolk, Va. It was found that three of the plants were using sewn open-mouth multiwall bags, one plant used only sewn valve bags, and the remaining two plants used both types of bags. The analysis showed that, by standardizing on sewn open-mouth bags and using open-mouth bag filling machines, an annual savings of about $30,000 was possible. A substantial savings also resulted from standardization on size and construction of bags. The Union Bag packaging engineers also created a basic design for all the Smith Douglass brands (some 160 different designs had been used prior to the study), economizing on print copy and dropping a yellow outer sheet on the bags.

F. W. Tunnell & Co.

THE situation at F. W. Tunnell & Co., Philadelphia, was a little different from that at Smith Douglass. This firm had used mul-



A new bag design, prepared by the bag manufacturer, is examined in the warehouse by L. I. Hanbury (left), assistant superintendent at the Smith-Douglass plant in Norfolk, Va., A. M. Boylis (center) of Union Bag-Camp Paper Corp., and J. B. Lynch, general purchasing agent for Smith-Douglass. At the right, the group observes the operation of a bag-closing machine that furnishes regular and attractive closures with a saving in labor and material.

tiwall bags to package most of its fertilizers since 1939. In the early stages, Tunnell tried packaging fertilizer in open mouth multiwall bags, using an automatic scale. At that time, they could fill and close only seven or eight bags a minute, —so they changed over to a multiwall valve bag and, with a valve packer, were able to fill and close as many as 13 bags per minute.

Packaging engineers, studying operations at Tunnell, suggested the company switch back to open-mouth multiwall bags. Instead of automatic scales, however, Tunnell installed bagging equipment which enabled them to step up their production rate from 13 bags to 18 bags per minute, per machine.

At Tunnell, fertilizer is bagged as it is ordered. The truck making the pickup pulls into the docks and places the order. The type of fertilizer wanted (Tunnell's two basic fertilizers are divided into about 35 grades) is relayed to the operator of a bridge crane. He uses his 2½ cubic-yard clamshell bucket to scoop up the desired material. He then loads it into the crane hoppers (one for each of the two Union I & C Baggers). The material passes through a shakeout screen to the hopper above the bagger. The bag filling operator presses the starter button, which automatically delivers the preweighed fertilizer through the machine's bag chute in an endless series.

The filled weight drops each of the bags onto a moving conveyor, which carries it at 40 feet per minute to a sewing head. After being closed, the filled bag then falls onto a rubber belt, and is carried onto a conveyor system, which can deliver to any one of three trucks in the docks. Three 24-foot retractable conveyors are electrically extended into the truck vans to facilitate loading. These are gradually retracted as the truck is loaded.

Tunnell reports that 75% of its fertilizer packing is done in multiwall paper bags. Most of this is packed in 80 pound units. Burlap bagging is done as requested. The new bagging equipment lineup permits Tunnell to switch to burlap bagging faster than the old valve-type system, saving two to three minutes on the switchover. This switchover often is made 20 to 25 times daily during the company's heavy production period.

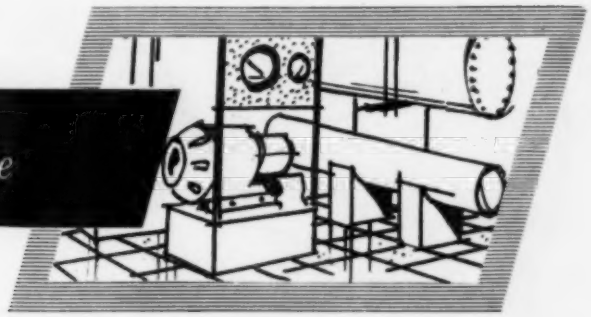
Robertson Chemical Corp.

ONE of the major changes in packaging operations at the Norfolk, Va. plant of Robertson Chemical Corp., was a switch from sewn valve to open-mouth bagging equipment. According to S. H. Hall, superintendent of the plant, substantial savings now are being made through closer weight tolerances in bagging with the new equipment suggested by the packaging engineers, who studied the Robertson installation. "This can cut 'give-away' in half, and effect substantial savings over a period of a year," he pointed out.

Efficiency measures adopted at the plant included: (1) reduction of bag sizes; (2) adoption of bags with board tape strips; (3) installation of new equipment allowing both pulverized and pelletized fertilizers to be packaged in the same mill; and (4) adoption of a new packaging setup which allowed bagging of burlap or paper in different sizes ranging from 25 to 200 pounds.

According to Robertson officials, the elimination of one man from the conveyor line was made possible with the new methods. A bagging machine operator now spouts bags, which then drop onto a moving conveyor after they have been filled. The bags move to the second operator, who folds and guides the bags into the sewing unit. The conveyor then moves the completed bags to a third man, who stacks them for loading. With the new method, reports the company, it now is possible to package 51 tons per hour, as compared with 39 tons with the previous method.

(Continued on Page 95)



Flowability Of Dust Formulations

The flowability of a dust formulation is one of its important physical properties, but unfortunately one which too often is not controlled because of the lack of a simple method for the determination of flowability. A rapid method of obtaining a "flowability index" is described.

by Marshall A. Malina
Velsicol Chemical Corp.
Chicago

THE question of whether or not a formulation has good flowability has always been a problem. Many who are responsible for the application of the dusts have developed the art of judging this property by rubbing the dusts between their fingers or blowing them off their palms. The actual property, they observed, is difficult to define. Only the actual field test, that of testing the performance of the formulation in the dust applicator, can be used as a standard. It was therefore desired to develop a simple laboratory test which could be used in measuring this property.

Direction of Investigation:

Certain basic conceptions often held among formulators were accepted as starting points. They are:

1. Atttapulgites have good flowability
2. Unimpregnated talcs have good flowability
3. Kaolins have poor flowability.
4. Diatomaceous earths have poor flowability
5. The flowability of a clay will decrease as an increasing amount of oily substance is impregnated upon it.

Apparatus:

The apparatus which was ultimately developed is shown in Figure 1. It consists of a feed funnel fitted with a 60-mesh screen and a receiver. This assembly is clamped to a Variable Frequency Vibrator (U. S. 2,561,027; July 17, 1951), which is used here to vibrate the screen in a reproducible manner.

Procedure:

A five-gram sample of the formulation to be tested is added to the feed funnel of the apparatus. The apparatus is clamped in place on the vibrator and the shaking is started. The time from the start of the shaking until all the clay has passed through the screen is measured.

The light pack bulk density of the formulation is determined in the standard manner with a Paint Pigment Volumeter (Scott, Schaeffer, and White, Sargent), Sargent Catalogue #S-64985, so that the weight of formulation may be converted to volume.

The flowability index, defined here as the flowability of a dust or dust formulation relative to the flowability of unimpregnated attapulgite (100), is then expressed by:

$$\text{Flowability Index} = \frac{t_a\, d_a}{t_f\, d_f} \times 100$$

(*Continued on Page* 95)

Table I. Flowability Indices.

Sample	Seconds/5 grams	Density grams/cc	Flowability Index
Attapulgite	63	0.280	100
Talc	34	0.464	112
Pyrophyllite	46	0.432	89
Kaolin	329	0.240	12
Diatomaceous earth	2700	0.08	8
Attapulgite w./34% Heptachlor	45	0.445	88
Attapulgite w./29% Heptachlor	45	0.415	94
Attapulgite w./20% Heptachlor	50	0.366	96
Attapulgite w./15% Heptachlor	52	0.341	99
Attapulgite w./ 0% Heptachlor	63	0.280	100
Talc w./10% Chlordane	7300	0.52	0.5
Talc w./15% Chlordane	240	0.50	15
Talc w./ 5% Chlordane	105	0.48	35
Talc w./ 0% Chlordane	34	0.464	112

Electron micrographs showing plate-like Micro-Cel E and spherical Micro-Cel B structures.

1μ

Micro-Cel is quite compatible!

Micro-Cel®, Johns-Manville's new synthetic calcium silicate, is chemically inert and is compatible with nearly all toxicants. Micro-Cel cuts shipping costs by permitting such high toxicant concentrations as 50% Heptachlor, 70% Toxaphene and 75% DDT. Micro-Cel's unique structural characteristics (surface areas up to 175 sq. m/gr) reduce caking, improve flowability, increase suspendability and extend shelf life. For further information, samples and technical assistance, mail in the coupon below!

JOHNS-MANVILLE
Celite Division

1960

JOHNS-MANVILLE, Box 14, New York 16, N. Y.
In Canada: Port Credit, Ontario.

☐ Please send further information.

I am interested in using Micro-Cel with the following toxicants: _____

☐ Please send free sample of Micro-Cel.

☐ Please have your local Sales Engineer contact me.

Name_____ Position_____

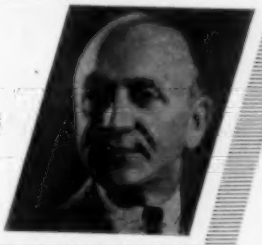
Company_____

Address_____

City_____ Zone____ County_____ State____

Fertilizer Views and News

Dr. Sauchelli is a Consultant Agronomist to the Agricultural Chemicals Industry.



Dr. Vincent Sauchelli

Modern Fertilizers Produce Wholesome Foods

All Flesh is Grass.

THE above simple statement embraces a fundamental truth. Plants have the ability to subsist on the simple chemical elements of air, water and soil through the energy of sunshine. Animals and humans lack such ability: to live they must eat grass or one another. (Grass is here used as a symbol of plant life.) Hence, the unchallengeable importance of plant life to human existence. Take away chlorophyll and sunshine and that marvellous, global manufacturing process in the green leaf—the world's basic industry ceases and with it goes the human race.

It is elementary to point out that an adequate and balanced supply of the nutrients required by humans and livestock depends largely on the chemical composition of the cultivated plants. It is not generally known, however, that this composition is not identical for different species of plants; in fact, it may be quite different for different varieties of the same species. Furthermore, the one and same plant will often vary substantially in its content of essential nutrients at different stages of its growth. Modern chemistry enabled scientists to discover many of the growth factors which can influence a crop's chemical composition or nutrient content. Such discoveries emphasize the important role chemical fertilizers can and do play in the production of highly nutritious foodstuffs.

The modern viewpoint, established by that renowned German chemist, von Liebig, is that the nutrition of plants depends upon the minerals which the plant obtains from the soil through its roots. This knowledge made possible the creation of the fertilizer industry, and with it the intensive production of food crops to feed a rapidly increasing human population. Do the food crops thus grown with chemical fertilizers have the high nutritional quality needed for maintaining the health of man and animals? This question has been raised frequently, particularly by the advocates of exclusively animal manures and composts for fertilizing such crops. The answer has been given convincingly by scientists competent to speak with authority, and accepted by all thinking persons unbiased by reason of faith or otherwise. The high level of health in all the countries of the world where chemical fertilizers are used intensively to grow crops for man and animals testifies to their value. Wherever possible modern farmers utilize chemical fertilizers and organic materials from both plant and animal sources in their soil management practices. This is known as "balanced" fertilization.

Balanced fertilization

To secure this balanced fertilization in practice is not always easy: soils differ significantly in chemical composition, acidity, structure and water-holding capacity and in their content of microorganisms. Crops differ in mineral requirements. Research since von Liebig's time at many agricultural experiment stations has been devoted continuously to the purpose of finding the best methods of fertilizing for maximum yields and quality. In quite recent years, the research projects have been aimed at learning how fertilization can influence nutrient elements, such as the amino acid composition of plants. Nitrogen, phosphorus and sulfur have a great influence on these building blocks of protein. An optimum balanced fertilization may be defined as that which will produce crops containing a maximum amount of amino acids and vitamins, recognized by nutrition-

(*Continued on Page* 93)

"Agricultural Chemicals" is pleased to announce that Dr. Vincent Sauchelli resumes with this issue offering his informed observations on developments in the fertilizer industry exclusively through his monthly column in "Agricultural Chemicals."

Dr. Sauchelli is currently on a six-month trip through some 20 countries, including India, South Korea, the Malay states, and Europe. His column will continue to appear each month.

Dr. Sauchelli will also contribute feature articles on fertilizer topics in future issues of "Agricultural Chemicals."

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The AGRICULTURAL Applicator

- New Blower Attachment
- "Spray-On" Calcium Arsenate
- 4-State Meeting Planned
- Bottom Loading Procedure

A "spray-on" form of calcium arsenate is being offered by the General Chemical division of Allied Chemical Corp. for use on cotton. Use of the spray is expected to reduce drift problems associated with calcium arsenate dusts. Story on page 56.

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A Preliminary Report

Experimental Dust Distributor Offers Less Drag And More Payload

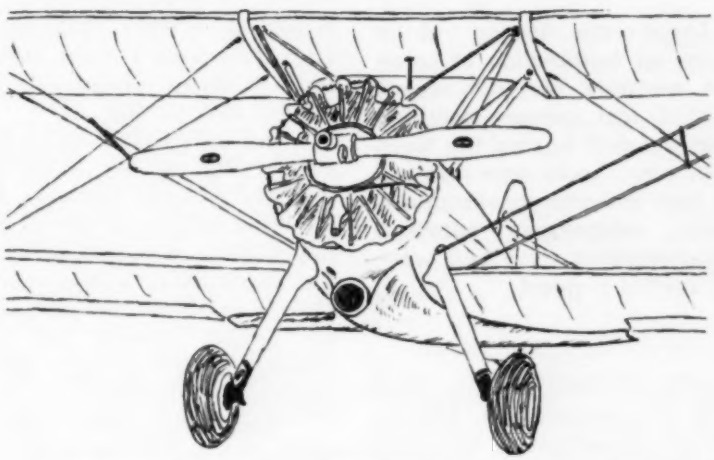
A project is underway at Mississippi State University to develop a blower-driven, positive-energy dust distributing system that would be more efficient than the traditional ram-air venturi spreader. Among the advantages: low power requirement, more payload, and reduced drift.

by Fred L. Shuman, Jr.
Agricultural Engineering Department
Mississippi State University

AIRPLANES have become important agricultural machines and, like other farm machines, they help a declining number of food producers serve an increasing number of consumers. In spite of this, however, research on the aerial phases of farm mechanization has lagged far behind.

Until recently, the burden of equipment work has been carried largely by individual applicators. In some areas, such as carrying capacity, swath width, and dust feeding mechanisms, the problems of 30 years ago remain unsolved.

In the past few years, however, a number of governmental agencies and universities in the United States have shown increasing interest in the improvement of aerial application procedures. Some have made significant contributions and are continuing their efforts. An example of this work is a project under way at Mississippi State University to develop a blower-driven, positive-energy dust distributing system that would be more efficient than the traditional ram-air venturi spreader.



Drawing of the Positive Energy System Installed on a Stearman Biplane

Tests have shown that greater energy can be given to material passing through the distributor by increasing the velocity of the air flowing through the system. In so doing, greater control can be exercised over placement of the material. In the past, attempts have been made to increase this air velocity by progressively decreasing the size of the tube through which the air is flowing. The venturi, however, is an extremely inefficient device. In addition to the inherent inefficiency of the system, the physical characteristics of the conventional venturi spreader result in the creation of considerable aerodynamic drag. This drag consumes approximately 40 horse power at the normal flight speeds.

By streamlining this system and fairing it into the fuselage, as shown in the accompanying illustration, it may be possible to effect a saving of most of the 40 horsepower normally lost to drag. By driving the blower as directly as possible from the engine, it is possible to eliminate another drag source, the windmill, which also is a relatively inefficient device. In the experimental system, a belt-driven blower is used to supply the high velocity air.

This system, when perfected, should have the following advantages:

Low Power Requirement. The present installation utilizes a blower which is rated at seven horsepower. Tests will indicate whether this power must be increased or reduced.

Increased Pay Load The power saved (over conventional distributor) could be applied toward carrying a larger payload. As a result, there would be less time on the ground as compared with time in the air, and fewer trips per job.

(Continued on Page 103)

Spray-On Calcium Arsenate Successful in Tests on Cotton

Large-scale testing of a spray-on formulation of calcium arsenate for boll weevil control last season indicated that the drift hazard has been overcome. Applicators involved in tests indicate: application is easy, advantages outweigh disadvantages, and boll weevil control is good.

AGRICULTURAL applicators in Louisiana and Arkansas this past season sprayed many tons of a newly-developed high suspension calcium arsenate for boll weevil control in a test program conducted by the General Chemical Division of Allied Chemical Corporation. The new formulation, produced by the division, now is being marketed commercially under the trade name, High Suspension Calcium Arsenate.

The reason for the test program was that, although calcium arsenate long has been recognized as a highly effective boll weevil control chemical, the drift hazard presented difficulties in the highly-integrated farming operations of the modern agricultural South, where arsenical-susceptible crops sometimes are grown on acreage adjacent to cotton. In 1955, however, reports of boll weevil resistance to chlorinated hydrocarbons caused renewed interest in calcium arsenate. In 1956, General Chemical's research department, in an effort to reduce the drift problem, began work on the development of a calcium arsenate that could be applied as a spray. The result, High Suspension Calcium Arsenate, was offered commercially for the first time in 1959.

Spray-on calcium arsenate is a finely-ground powder, readily suspendable in water. Although five pounds of the product will go into suspension in one gallon of water, the manufacturer reports that a mixture of one pound per gallon for ground sprayers and two pounds per gallon for airplane application will suffice.

More than a score of aerial applicators sprayed this product in 1959, using all types of airplane spraying equipment available in the mid-south. All reported: Application is easy. Advantages outweigh disadvantages. Boll weevil control was good.

One experienced applicator, in order to answer inquiries from other aerial applicators, prepared a list of suggestions for spraying High Suspension Calcium Arsenate by airplane. He suggests:

1. A premix tank be rigged so that mixture can be continuously agitated while waiting for plane. Tank should be open at top and have a drain plug for cleaning. To mix, fill tank ⅔ full of water; pour in High Suspension Calcium Arsenate and allow to sink before stirring; fill tank with desired amount of water and start agitating. Mixture should contain 2 lbs. High Suspension Calcium Arsenate per gallon of water.

2. Plane sprayer tank should have drain plug or gate for cleaning; however, belly tanks of the Sorensen type, with no bottom openings, have been used. When filling the plane tank, the mixture should be strained through a 20 mesh screen to keep out foreign particles. When plane tank is filled, do not allow to stand—start spraying operation at once. While ferrying plane to the field, the pump should be operating with booms shut off to allow by-pass agitation.

3. The line strainer between the pump and tank should be approximately 20 mesh screen. Fiber filters are not satisfactory. Strainer should be inspected and cleaned several times daily.

4. Most pumps have proven satisfactory. No operators have reported excessive wear. Centrifugal pumps and gear pumps (where drive gear operates in an oil bath) are most common. Pumps of low volume type, or with meshing brass pumping gears, are not satisfactory.

Ordinary spray equipment can handle the new calcium arsenate product with the addition of the components shown below. Left to right is a filler screen, three small line strainers, scme 6X Number 33 nozzles, and a 20 mesh suction strainer.

5. All nozzle strainers should be removed, if they are present. Size of core and nozzle tip, as well as exact pressure, will vary with type and speed of aircraft. Nozzle tip should be No. 6 or larger. Pressure should be adjusted to allow pattern and coverage desired with delivery of approximately 4 gallons water per acre. Most state recommendations call for 7-10 lbs. calcium arsenate per acre for boll weevil control. 8 lbs. in 4 gallons of water has given good results.

6. Mix tanks, plane tank, and sprayer system should be emptied and flushed out with clear water at the end of each day's operation.

Briefly, the chemical is mixed well; not allowed to stand in the plane, strained through 20 mesh screens only; number 6 or larger nozzles are used, cores, pressure and speed are adjusted to apply a good pattern at 4 gallons per acre, and equipment is flushed with clear water after use.

Spray-on calcium arsenate dries quickly and plants sprayed with it turn white. This is a distinct advantage to the agricultural applicator who can tell if he has missed a spot in the field, or has trimmed the ends properly. Many pilots say that it dries fast enough so that they do not need flagmen.

The modernized version of calcium arsenate dries quickly and plants sprayed with it turn white. The excellent coverage obtainable is shown above.

Application of High Suspension Calcium Arsenate by ground equipment also was excellent during 1959. Representatives of General Chemical, spray equipment manufacturers, county agents, and dealers were busy during most of the insecticide season last year helping representative farmers and applicators spray calcium arsenate. Because High Suspension Calcium Arsenate makes good suspension and sprays out easily, cotton sprayers on the farm, whether modern high clearance rigs, tractor-mounted sprayers, or trailer-mounted sprayers were easily set-up. Several suggestions, most of them just good farming practices, were helpful to the users of ground sprayers.

1. Sprayers must be thoroughly cleaned and kept clean. High Suspension Calcium Arsenate must be mixed with water before entering the tank. This can be accomplished by slurrying the mixture, or by use of a screen filling basket filled with the chemical and washed through as the tank is filled with water. Mixture should be approximately 1 lb. High Suspension Calcium Arsenate per gallon of water.

2. Suction strainer should be 20 mesh screen. Line strainers between pump and nozzles should be 50 mesh screen, and all nozzle strainers removed.

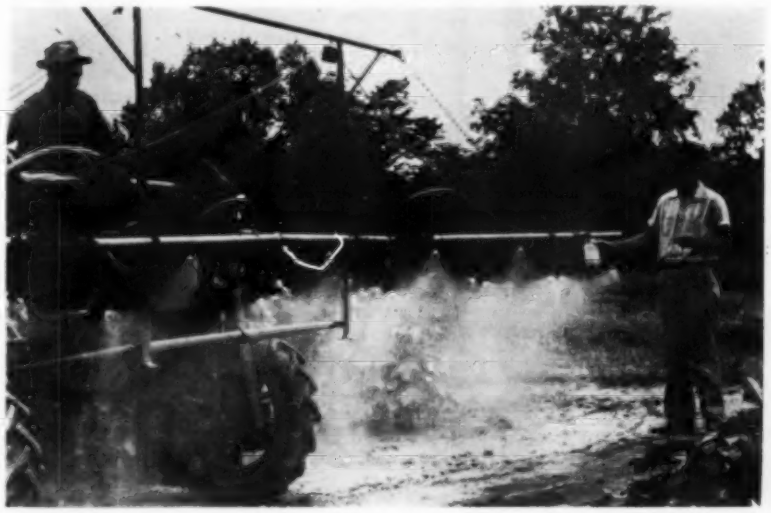
3. By-pass agitation is necessary. This will require a pump with sufficient capacity to supply the nozzles and return liquid through the by-pass line for agitation. This line must be extended to bottom of tank to produce a boiling action.

4. Nozzles should be No. 6X or larger. High Suspension Calcium Arsenate at 1 lb. per gallon of water will spray through smaller nozzles; however, No. 6 nozzles will be needed to spray the 7 to 10 lbs. recommended by state experiment stations.

Equipment manufacturers and agricultural engineers are alert to the need for better application equipment and know-how, because of the development of many outstanding pesticides that are formulated as wettable powders. Application equipment manufacturers also are studying new approaches and making changes in their new models. Many companies also offer conversion kits for older model sprayers still in use.

Since there is no known or suspected resistance by the boll weevil to calcium arsenate, spray-on type calcium arsenate can be expected to be a factor in cotton production for many years. As the manager of a Newellton, La., plantation put it recently, "Regardless of what program we are following, when the weevil pressure really hits us, we use calcium arsenate to make a crop."★★

Although calcium arsenate long has been an effective cotton pest control chemical, in the dust form it presents hazards to susceptible crops through drift. The spray rig here is being calibrated for county agent co-operative field trials of General Chemical's new High Suspension Calcium Arsenate.



Increased Attendance Anticipated For 4-State Applicator Meeting

by Loren H. Milliman
Portland, Oregon

SO much interest already has been shown in the second annual 4-State Aerial Spray and Dust Applicators Conference, to be held Oct. 10 and 11, in the Chinook Hotel, Yakima, Wash., that a markedly increased attendance is anticipated. This is the word from Dr. Robert E. Jones, president and general manager of Norkem Corporation, Yakima, who is heading the group making arrangements for the meeting.

Last year, more than 230 attended the two-day meet in Yakima, and this year, three months before the conference opens, requests for display space have exceeded the amount of space available.

In addition, aviation industry groups in Washington, Oregon, Idaho, and Montana have scheduled simultaneous meetings to be held in the Chinook Hotel. Complete support of the four state aerial applicators' associations, Washington State University, Oregon State College and the University of Idaho is being given, Dr. Jones added.

Talks on various phases of the aerial application of agricultural chemicals will be made Oct. 10. On Oct. 11, the group will move to the Yakima municipal airport, where actual demonstrations will be made by the newest agricultural aircraft and other equipment.

Among those scheduled to address the aerial applicators are Dr. Max Goebel, Wilmington, Del., director of research, industrial and biochemical division for Du Pont; Dr. Ogden Riddle, Davis, Calif., consultant to Agricultural Chemicals, Inc., and Arthur Wilson, Portland, Ore., a representative of Columbia-Southern Chemical Corp.

Dr. Riddle will talk on PX-1 and related chemicals (phosphorus compounds) which are said to have produced startling results when applied at the rate of 1 pint to the acre on wheat, peas, and beans. Use of Chloro-IPC to control dodder in alfalfa is the topic on which Mr. Wilson will speak.

College specialists from the Pacific Northwest on the program include Dr. Virgil Freed and Dr. William Furtick, respectively associate chemist and associate professor of farm crops, both from Oregon State College, Corvallis. Dr. Freed will tell of the use of adjuvants in weed-control chemicals, while Dr. Furtick will outline weed control in fall wheat.

Dr. Thomas Muzik, Washington State University professor of

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agronomy, will compare some of the newer chemicals in weed control.

A representative of the Spencer Chemical Co., Kansas City, Mo., is expected to be present to tell about its product, Carbyne. American Chemical Paint Co. also has promised to send a speaker to tell of developments in weed control.

The aviation trade groups and aerial applicators will have a joint luncheon Oct. 10. Planes for transportation of company officials and others also will be on display during the conference according to Dr. Jones.

•

Arizona Assn. To Meet

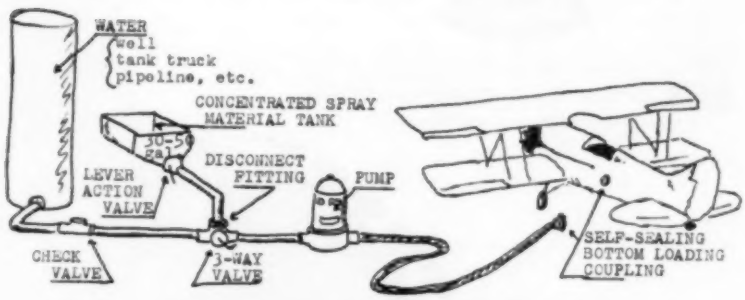
The Arizona Aerial Applicators Association will hold its 8th annual conference Jan. 12 and 13, at the Wigwam, Litchfield Park, Ariz. Among the features of the meeting will be an aerial demonstration at the Litchfield Park Airport.

•

Florida Group Adds Chapter

A third regional chapter, The Palm Beach County Chapter, has joined the Horticultural Spraymen's Association of Florida. Bill Murray (left), president of the newly-organized chapter, receives a supply of imprinted decals from state president Ted Kaplan of Miami. This insignia is placed on trucks and other equipment and also is used in group-sponsored newspaper advertising.

Bottom Loading for Added Safety



Component Arrangement for Bottom Loading System

THE California Agricultural Aircraft Association, Fresno, has published, at the request of its Safety Committee, information concerning safe methods for filling airplane spray tanks with organic phosphate insecticides. Bottom loading procedures, in which the spray material is loaded through a coupling on the side of the aircraft rather than on the top, are contributed by Wayland S. Fink of Patterson Flying Service, Patterson, Calif.

In this method of bottom loading, fixed and mobile loading equipment essentially are the same except that electric power may be used for the pump at the fixed loading site.

Loading Procedure

The proper amount of concentrated spray material for one airplane load is put into the spray material tank. It is held in this tank, undiluted, until the aircraft arrives and is ready to load. A lever action valve then is opened, allowing the material to flow to the pump, where it is picked up and pumped through the loading hose and into the airplane through the bottom loading coupling. When the material tank is empty, the lever action valve is closed and the three-way valve is turned to allow water to flow through the pump and be delivered into the airplane. The large volume of water following the spray material effectively flushes any residual chemical from the loading hose.

If, for some reason, it is not desirable to load the chemical in the material tank into the aircraft at this time, the spray material can be removed from the tank and returned to the original container for application at a later date, since it has not yet been diluted. This may be done by means of the following simple procedure: disconnect the fitting between the lever action valve and the three-way valve; and, by opening the lever action valve, the concentrated material may be drained from the tank and into the original container. A different material then can be loaded or the loading equipment can be washed out if no more spraying is planned for the day.

Cleaning Spray System

The same type of quick coupling used for bottom loading can be screwed on the end of the boom to flush out the boom, very thoroughly and quickly. Then, by actuating the spray-recirculate valve in the aircraft, the pump may be back-flushed. This can be done in about two minutes, fast enough to enable anyone to completely wash out the spray system between jobs in which different kinds of spray materials are used and at the end of the flying day. It goes without saying that equipment lasts much longer if it is stored, even for a short time, in a clean condition.

An incidental advantage of bottom loading in addition to safety, cited by Mr. Fink, is the saving of time, since the aircraft engine does not have to be shut off, as it must in loading through the top. Since the pilot does not have to help with the loading, he does not spend extra time climbing in and out of the plane and, finally, by using a 5 hp pump, an aircraft may be loaded with 160 gallons of spray material in one minute, or less.

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PEST ROUNDUP

By Kelvin Dorward

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Survey & Detection Operations, Plant Pest Control Division, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in U.S.D.A.'s pest surveys throughout the U.S.

Corn Borer, Boll Weevil, and Other Insects Increasing

BY the latter part of July, populations of the European corn borer were increasing rapidly in some areas. The borer was quite heavy on more advanced corn in the southeastern area of South Dakota, where there was an average infestation of 93 per cent and a count of 259 borers per 100 plants. In Richland and Cass Counties, North Dakota, the larvae were first and second instar and averaged 236 per 100 plants. Infestations appeared several times greater than those experienced in 1959. The highest counts in Minnesota were from the southwestern district, where the counts averaged 199 borers per 100 plants.

By mid-July, treatment for the European corn borer was underway in many areas of Nebraska. Infestations in some areas of the State were up to 100 per cent. Damage to late-season corn by the second-generation borer in Illinois is expected to be more severe than in 1959. In general, populations may increase noticeably over last year. In Jefferson County, Kansas, a survey of 24 cornfields showed 67 per cent of the fields infested. Ten per cent of the stalks had borers, with an average population of 16 per 100 stalks in the infested fields. The annual first-brood survey in Iowa showed an average of 41 per cent of the corn plants infested. These infestations averaged 66 borers per 100 plants. It is expected that the southern two-thirds of the State will have a moderate second brood on late corn. In the Wooster and Lima, Ohio areas, the borer severely attacked sweet corn; and, in the west central and northwestern areas of the State, damage was much heavier than at the same time in 1959.

Populations of the European corn borer were recorded as being moderate to heavy in Massachusetts during mid-July. In Virginia, unusually heavy damage to corn, potatoes and tomato vines and some flower plants was reported; and infestations were heavy in commercial sweet corn in Carroll County, Maryland. The borer heavily infested some corn in Yadkin County, North Carolina, and attacked grain sorghum in the Tennessee Valley of Alabama.

The spotted alfalfa aphid, which until July had caused very little concern, developed rather rapidly during the month in some areas. Populations of the insect had been generally light in Stanislaus County, California, until the latter part of July when hot weather caused a rapid increase, with some fields becoming severely infested. In the Imperial Valley of Imperial County, California, populations ranged from light to severe. The aphid began a noticeable increase in the Yuma area of Arizona during early July and, by the middle of the month, infestations were heavy in most areas of the State, with considerable damage being recorded in many fields.

Populations of the spotted alfalfa aphid ranged from light to heavy and were scattered in southern and eastern New Mexico. The insect was building up in alfalfa throughout the western two-thirds of Oklahoma, with honey dew appearing in the more heavily infested fields. Damage was recorded as far east as Okfuskee County. This was the first serious infestation of the insect in that county since 1956. In Colorado, counts averaged 1,000-2,000 per 100 sweeps in Alfalfa near Pritchett, Baca County, while populations were low or absent in other parts of the State.

The boll weevil, by the latter part of July, was becoming serious in some cotton areas. Damage by the weevil was heavy in areas of North Carolina, where overwintering populations were high and early treatments were not followed. Heavy rains in some areas of the State made the problem more serious. The weevil was on the increase in South Carolina, with infested fields in the south central area showing 70-80 per cent infestations. Several Piedmont counties had fields losing half of the squares to weevils. Counts of squares in middle and south Georgia, showed an average of 19 per cent infested, with the range being 0-84. There was also an increase of boll weevil infestations throughout most areas of Alabama. Among the northern counties, the highest infestation was 60 per cent in Madison County.

Boll weevil activity was on the increase in west Tennessee, where in the southern part of the area punctured square counts averaged 25 per cent. Although weevils were present in all areas of the Missis-

(Continued on Page 96)

TOUGH MATERIAL SPECIALIST—

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BROKEN GLASS reclaiming is the prime use of this Michigan Model 12B owned by Fairmount Glass Works, Indianapolis, Indiana.

BROKEN TILE, 400 tons per 8 hour day—that's the output of the two 12B's owned by Oconee Clay Products Co., Milledgeville, Georgia.

DOLOMITE, charged directly into red-hot open hearths, is this Michigan's tough, but successful assignment in this Illinois steel plant.

COKE, used by American Brake Shoe Co, Buffalo, is dumped into hopper. Note cramped quarters easily negotiated by the Model 12B.

FERTILIZER, tight-packed and hard to dig, yields to powerful Virginia-owned Model 12B. Note the heaped bucket, a "trademark" of all Michigans.

Your "tough jobs," too, are made to order for Michigan Tractor Shovels. Model 12B capacity is 3,000 lbs, buckets are available to carry from 6 to 27 cubic feet. Write for details.

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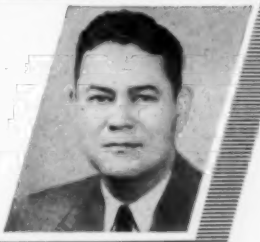
LISTENING POST



By Paul Miller

This department, which reviews current plant disease problems, is a regular feature of AGRICULTURAL CHEMICALS. The comments are based on observations of collaborators of the Epidemiology Investigations, Crops Protection Research Branch, USDA, Beltsville, Md.

Disinfestation of Planting Sites Improves Tree Growth

DISINFESTATION of planting sites improves growth of navel orange trees on Troyer citrange rootstock, according to L. J. Klotz, T. A. DeWolfe, and M. J. Garber, of University of California Citrus Experiment Station, Riverside, California, and D. O. Rosedale, Farm Adviser for San Diego County, who reports on an experiment planned to determine whether Troyer citrange rootstock could be successfully used in soils contaminated with the citrus brown rot and gummosis fungi, *Phytophthora parasitica* and *P. citrophthora*, and whether pretreatment of planting sites would pay when this rootstock was to be used (3).

The experiment was located in a section of an orchard where three successive plantings, in 1955, 1956, and 1957, of navel oranges on sweet orange rootstocks had failed. Root rot caused by *Phytophthora* spp., which were abundant in isolates made from soil samples, probably was responsible for failure of the trees to establish themselves. Before the 1957 planting, the tree sites had been treated with sodium-N-methyldithiocarbamate (SMDC) but without precautions to prevent recontamination.

Circular basins, about 50 square feet in area, were made around each tree site, and the chemicals were applied in water at the end of February 1958. SMDC 4S, 1 pint per basin, and 85% W 3,5-dimethyltetrahydro-1,3,5,2H thiadizine-2-thione (DMTT), 9 ounces per basin, were the chemicals used. To prevent, or at least delay, recontamination from inoculum blown or splashed from surrounding soil, Bordeaux mixture 12.7% was dusted onto the surface of the treated plots on March 7 and March 26. Well water, presumably free from *Phytophthora*, was used on the plots and run-off was directed away from the treated sites. Soil samples taken from treated sites on March 19 and June 12 did not yield *Phytophthora* spp.

Navel orange trees on Troyer citrange rootstocks, from a *Phytophthora*-free nursery, were planted July 23, 1958, 133 days after the soil was treated. Trunk circumference was measured when the trees were planted and 437 days later, on October 28, 1959. Difference between the two measurements was the basis for appraising the effectiveness of the treaments. Increase in circumference of trees planted in the treated sites averaged 74% more than that of trees in untreated sites. The two chemicals were about equally effective.

The total cost of the treatments amounted to about 90 cents per tree. Klotz and his associates concluded that pretreatment of planting sites was economically feasible and that, under some conditions, it would be worthwhile even when trees on Troyer citrange root-stock were to be planted.

Mango Anthracnose Control

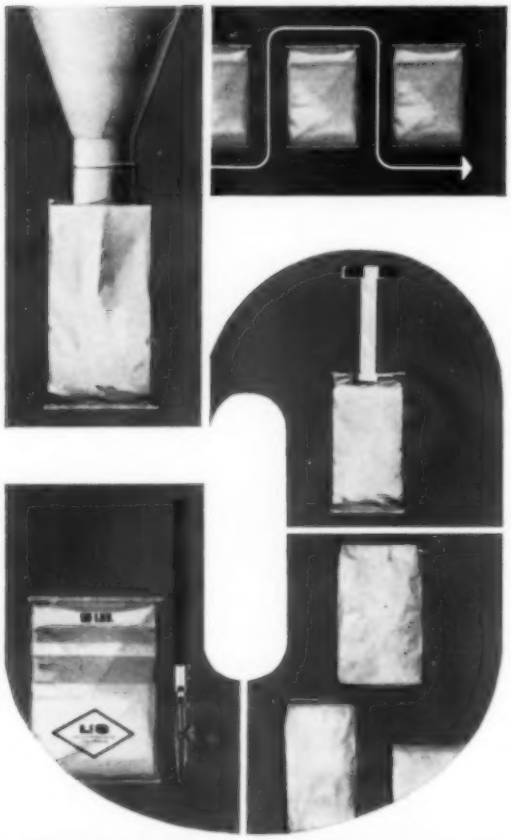
Minoru Aragaki and Mamoru Ishii (1), of the University of Hawaii, compared several different fungicides for effectiveness in controlling mango anthracnose (*Colletotrichum gloeosporioides*), an important disease in Hawaii. Most desirable varieties are susceptible and chemical control is necessary to prevent considerable loss. In preliminary experiments in 1955, zineb (zinc ethylene bisdithiocarbamate) resulted in increased yield, while captan (*N*-trichloromethylthio) - 4 - cyclohexene - 1,2 - dicarboximide) protected fruit best from anthracnose spotting. In 1957, captan and zineb applied in a split schedule and captan applied at biweekly intervals in a long schedule were the best treatments from the standpoints both of yield and anthracnose control.

Peach Tree Chlorosis

L. E. Dickens, W. J. Henderson, and Jack Altman (2), of Colorado State University, developed an improved method of using chelated iron compounds to control peach tree chlorosis in Colorado. In 1959, they tested three proprietary formulations, which they applied in 14-foot bands in the irrigation furrow on each side of the tree, immediately preceding the second irrigation. The furrow depth was increased 2 inches and the chemical applied in the dry form and covered to prevent its being washed away. Seven weeks afterward, trees treated with two of the compounds showed almost no chlorosis, whereas about 24% of the foliage of trees receiving the other compound showed moderate

(*Continued on Page* 97)

every year hundreds of multiwall users reduce total packaging costs thru UNION-CAMP'S



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WASHINGTON REPORT

By Donald Lerch

BEHIND the smoke screen of political charge and countercharge we hear in Washington these days, a definite pattern is shaping up on the farm issue. You can't get many people here to talk publicly about it yet. Everyone is waiting for the presidential candidates to make their major "farm" speeches before coming out into the open. But here are the indications and what they imply for the agricultural chemicals industry.

A split is developing between a free agriculture and a controlled agriculture, with the Democrats leaning heavily toward more controls. Senator John Kennedy's farm advisors are arguing for a bigger federal role in adjusting supply to demand, commodity by commodity.

Under a favored plan, the Federal Government would set national sales quotas for each commodity and allot each farmer now in business a market share of the national quota. Thereafter, the farmer could not sell any quantity of a commodity unless he had a market certificate to cover the sale.

To maintain some freedom in agriculture, farmers could buy or sell market certificates. They also could buy commodities to sell under their market certificates in cases where their own farm failed to produce up to the limit of the certificates they hold.

While this looks like a radical program, it already has the support of several farm commodity organizations. Some farm people here warn, however, that this plan would blunt the present drive toward agricultural production efficiency, and sales of both pesticides and fertilizers would drop, particularly for use on wheat, corn, cotton, and peanuts—crops now in surplus.

Aerial applicators are watching this development with great interest, too. Aerial spraying of wheat and corn for weed control has become a big item in aerial spraying operations. Any major cut in these crops would have an immediate effect on agricultural aviation.

The Republican farm program, whatever its details may be, is expected to go down the line for expanding farmers' freedom to farm with a minimum of federal control and a maximum of emphasis upon the individual farmer's responsibility to grow as efficiently and market as wisely as he can. While this program might aid farmers in some respects, it would not act to halt or greatly alter current farm trends or industry marketing practices.

No one knows better than those of us who work in Washington that three months is an eternity in terms of a hotly-contested political campaign. We may see many changes in promised farm programs and reforms before ballots are counted in November.

* * * * *

The National Agricultural Chemicals Association is heading toward its convention in California this month with a feeling of optimism and accomplishment.

Reports heard here in Washington are that 1959-1960 has been a pretty good year. Sales have been good for most companies. Press clippings flowing into NAC reflect a more favorable public view of pesticides than we've had for many years.

The feeling is that the expanded public information program begun a few years ago is starting to produce results. Since November, 1958, some 125,000 copies of the industry's basic "Open Door To Plenty" have been distributed. Just recently copies went to every nutritionist, dietician, professional home economist, and food technologist in the land.

In the past year some 11,000 copies of another basic information piece, "Pesticides and Public Policy," have been printed and most already have been put into the hands of federal, state, and local policy makers.

An NAC spokesman points to an item published in the Omaha *World-Herald*. Author of the item found a dead bird in the flue of his gas water heater and put it on the lawn of an anti-pesticide bird lover. He tipped off the local government officials and waited.

In a brief time the neighbor lady called local authorites in outrage, saying that a number of birds on her property had been killed by pesticides. The follow-up news story admitted she was a sincere bird-lover, but chided her for not stopping to find out the facts.

What impresses industry leaders here is that the facts are beginning to seep through. What's more, people are gaining confidence enough in the facts presented by the industry to stand up in public for them. The result is a more

favorable climate of public opinion toward the industry. No one is saying that the battle for public favor is won. But, at least some noticeable progress is being made. Industry leaders at the annual meeting will be looking with greater optimism toward a break through in public opinion that will give the industry the prestige its contributions to the economy and to the general welfare warrant.

• • • • •

The National Plant Food Institute, taking a realistic look at the probable cutback in agricultural acreages, is forging ahead in stimulating non-agricultural uses of fertilizers.

Forest fertilization was promoted at a special session of the World Forestry Congress in Seattle. The non-farm fertilizer market in the northeast is getting headline treatment at the Northeastern Fertilizer Conference in Hershey, Pa., at the end of this month.

Significantly, stress also will be put on turf and highway roadside fertilization, and the advertising and promotion techniques needed to sell more products in non-farm markets.

Agriculture is changing. Farm population is dropping. As farming becomes more efficient, there will be at least a temporary drop in farm acreage. These are views of top men in USDA.

NPFI spokesmen argue that if this is the future, it makes good sense to explore it and prepare for meeting its challenges.

• • • • •

Now that wildlife complaints have quieted down for the moment, it looks as if the next hurdle for the pesticides industry to overcome will be water pollution.

About 1,900 organizational leaders, most of them conservationists, are expected to meet in Washington, December 12-14, for a National Conference on Water Pollution. On the agenda will be a discussion of pollution of water, particularly irrigation water, by pesticides, and its effect upon fish, wildlife, and humans.

People concerned with water supplies here tell us they feel the question of whether pesticides get into water and create any significant hazards has not yet been resolved. This is another way of saying that most, if not all, of the old charges against pesticides will likely be dragged into public view again before they are successfully laid to rest by a parade of scientific facts.

Fortunately, NAC already has accumulated a persuasive amount of research information on water pollution. It indicates that, even in the few instances where traces of some pesticides have been found in water, their amount has been far below any level that would damage fish populations.

In a few cases where fish populations have dropped in areas of forest spraying, the cause has been fish starvation due to temporary elimination of insects. Fish populations recover as insect populations build up.

• • • • •

Without fanfare, a panel of fertilizer industry reprsentatives have recommended that the UN's Food and Agriculture Organization undertake a $2 million five-year program, financed by Industry, to expand the use of fertilizers in crop production in the world.

The fertilizer promotion would be a part of the FAO's "Freedom From Hunger" campaign. While observers from NPFI attended the meeting, the action was proposed by the International Potash Institute, the International Superphosphate Manufacturers Association, the Centre d'Etude de l'Azote, and the Sulphur Institute.

Method proposed is to stimulate farmers in developing countries to use more fertilizer through national programs of fertilizer tests and demonstrations and the use of soil testing. As part of the program, marketing studies would be prepared for use by the governments and fertilizer associations involved.

Although no action has yet been taken by the pesticide industry in relation to FAO's "Freedom From Hunger" campaign, there appears to be plenty of opportunity for the industry or for interested companies to participate.★★

"Realistic" Ammonia Price

Collier Carbon and Chemical Corp., Los Angeles, Calif., has announced that it is making a "deliberate effort to establish a more realistic price for anyhdrous ammonia in California." Effective Oct. 1, 1960, Collier's posted price for anhydrous ammonia will be $92 per ton, f.o.b. plant.

According to the company, the current California price of $66 per ton does not provide an adequate margin for the ammonia producer to obtain a fair return on investment. Collier pointed out that ammonia has been sold at an "unrealistically low price in California, while ammonia manufacturers east of the Rocky Mountains have found it necessary to increase their posted prices from $88 to $92 per ton." Collier emphasized, however, that, while its new price is based on a reasonable return on investment, the company will "continue to meet any competitive prices in its marketing area."

•

Research Study Offered

Theodore Riedeburg Associates, New York, is offering a new research study on marketing, development, sales, and distribution of pesticides to the agricultural field. The study describes avenues of agricultural chemical marketing heretofore not explored.

According to Mr. Riedeburg, who did the research, the study makes it possible for companies engaged in agricultural sales to go behind the scenes of intricate corporation marketing maneuvers and find much sought after, hard to get information that is vital to planning ahead. The survey is titled "Today and Tomorrow in Agrichemical Marketing." It is offered on a fee basis.

Arcadian® News

Volume 5 | For Manufacturers of Mixed Fertilizers | Number 9

ANNOUNCING the New ARCADIAN® Solution that supplies NITRATE, AMMONIA and ORGANIC Nitrogen

DURANA*

CHEMICAL COMPOSITION %							PHYSICAL PROPERTIES		
Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Formaldehyde	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Pres. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
37.0	13.3	53.4	15.9	8.0	9.4	7.2	1.235	0	36

DURANA is a new and different ARCADIAN Nitrogen Solution created by Allied Chemical research for fertilizer manufacturers who wish to produce premium-grade complete fertilizers containing nitrate nitrogen, ammonia nitrogen, and water-insoluble organic nitrogen. DURANA supplies all these forms of nitrogen economically in one ammoniating solution containing a total of 37% nitrogen.

Through the proper use of DURANA in manufacturing mixed fertilizer, approximately 20% of the total nitrogen from the solution is converted to water-insoluble organic nitrogen in the process of producing the fertilizer. As shipped, DURANA supplies approximately 25% of its total nitrogen as nitrate nitrogen and 55% as ammonia nitrogen.

DURANA Solution is an excellent source of nitrogen for the production of premium grades, such as tobacco fertilizers and specialty fertilizers. The agronomic value of nitrate, ammonia and organic nitrogen in such fertilizers is well established. In addition to providing these three forms of nitrogen, DURANA helps give fertilizers excellent mechanical condition and facilitates the production of granular-type fertilizers.

DURANA helps fertilizer manufacturers meet official recommendations. For example, North Carolina, Georgia and other states recommend a certain amount of nitrate nitrogen in tobacco fertilizers to get young plants off to a good start, particularly following chemical treatment of soils. DURANA supplies nitrate nitrogen plus slower-acting forms for continued healthy growth.

DURANA Solution *(formerly called Special "F" Solution)* was tested in many areas last spring with outstanding results. Production facilities are now being expanded to meet the anticipated demand for this new-type solution.

DURANA Nitrogen Solution is produced and sold exclusively by Nitrogen Division, Allied Chemical Corporation. It is a product of Allied Chemical research—the same research that originated nitrogen solutions for ammoniating superphosphate more than 30 years ago. Through the years, this continuing research has brought you many new methods and materials for making better fertilizers. For information about DURANA and other ARCADIAN Nitrogen Products, contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N.Y.

*DURANA is a trade-mark of Allied Chemical Corporation

The HOW and WHY of Fluid Flow Measurement

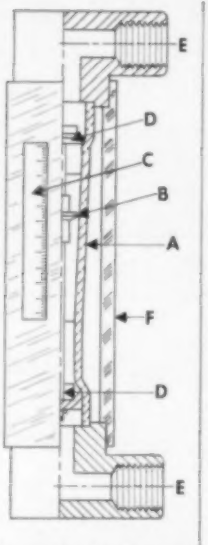


FIGURE 1

Front view of typical rotameter.
A: tapered glass tube.
B: measuring float.
C: flow rate scale.
D: stops to hold float.
E: inlet and outlet connections.
F: shield glass.

Let's consider the rotameter. It is an apparently simple device for measuring the rate of flow of the various liquids that are used in the manufacture of mixed fertilizers. Although there are many different designs, all rotameters function in essentially the same way. Figure 1 illustrates the principal elements of a common type of rotameter.

Here are the outstanding features of the rotameter:

1. **It's a completely self-contained unit.**
2. **It measures both very small and very large rates of flow. The range from the smallest to the largest flow rate can be as great as 20 to 1, with good accuracy.**
3. **Dozens of different accessories can be added for conveniences such as remote rate indication, recording, totalizing and automatic control.**

On the other hand, the rotameter—like any mechanical device—has certain limitations—

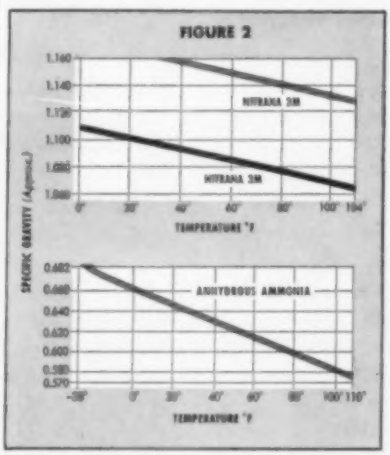
1. **The flow rate scale is correct only for a particular fluid, at one set of specific flow conditions. Variations in specific gravity, temperature or viscosity could cause appreciable errors.**
2. **The rotameter measures *volume*, not weight. Where a liquid contains gas, the scale reading actually will be in volumes of the *mixture*, and not of the liquid itself.**
3. **Difference in pressure between the rotameter's inlet and outlet may be great enough to permit some flashing of the liquid into vapor. This, of course, would cause a false reading. The flashing can be easily prevented.**

The Key Word is "Accuracy"

A rotameter designed for measuring water at 60°F will be quite accurate over a range of temperatures from 32°F to 130°F because it requires about a 72°F variation in temperature to change the specific gravity of water one percent. Not so with other liquids; more serious errors can result from changes in temperature, specific gravity or viscosity. For example, Figure 2 illustrates the marked influence that temperature exerts on the specific gravity of ARCADIAN NITRANA 2M and 3M, and ARCADIAN Anhydrous Ammonia.

NITRANA 2, 2M, 3, 3M and 7, and URANA 10, 12, 13 and 15 gain or lose about 1% in specific gravity for each corresponding 29°F change in temperature. For a similar change in specific gravity, NITRANA 6 requires about a 27°F temperature variation; NITRANA 4 and 4M, 33°F; U-A-S A, 50°F; U-A-S B, 22°F. ARCADIAN Anhydrous Ammonia is much more sensitive, requiring a mere 6°F temperature change to vary its specific gravity by one percent. The exact degree of change exerted by temperature on the specific gravity of any ARCADIAN Nitrogen Solution is always available from Nitrogen Division.

FIGURE 2



Influence of temperature on specific gravity.

Calibrating the Rotameter

Because there are variables involved in the composition of nitrogen solutions, and in the temperatures at which they are used, rotameters must be calibrated for accuracy. One method is to have liquid flow through the rotameter at a known rate for a known time, and then check for actual volume delivered. For example, a steady flow of liquid can be maintained and caught in a bucket or drum over a period of time (measured by stop-watch). This is simple with water and some other liquids, but proves more involved with volatile liquids such as some nitrogen solutions. These would have to be measured into a weighed amount of water or into a measuring tank under sufficient pressure to retain the ammonia.

In Figure 3 we have a curve that enables us to change from water calibration to calibration for URANA, NITRANA, or any other ARCADIAN Nitrogen Solution.

Let's assume that we have a rotameter which is designed for NITRANA 3, flowing at 60°F and 20 pounds per square inch gauge. The scale reads in gallons per minute at a density of 1.079, and the maximum capacity is 100 gpm. When we test the rotameter by putting enough water through it to make the scale read a steady 50 gpm, we find that in one minute we collect 52.4 gallons of water in our drum. Our calibration curve tells us that the Conversion Factor for a liquid of 1.079 density is 0.955. Multiplying the measured quantity of water, 52.4 gallons, by Conversion Factor 0.955 gives us 50.0, which checks out with our gpm setting.

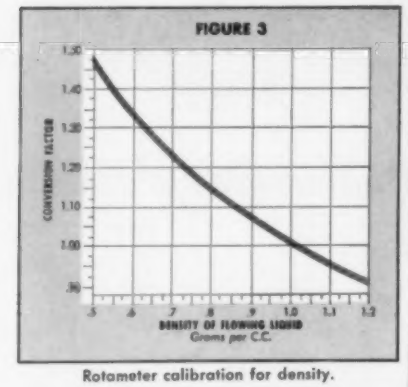
Let us suppose that another rotameter, designed for the same NITRANA 3 service, is tested and we find that we collect 54 gallons in one minute when the water flow rate reads a steady 50 gpm. Applying our Conversion Factor 0.955 again, we find that this rotameter delivered 1.6 more gallons than called for. Putting this error into percentage form ($\frac{1.6}{50} \times 100$) we arrive at 3.2%. That is, the rotameter, when in use with a liquid of 1.079 density, will deliver 3.2% more gallons than indicated by the observed flow rate. It's a simple matter, then, to apply this calibration to the gpm rate so as to get accurate flow measurement for this particular fluid.

Viscosity affects Accuracy

The Conversion Factor curve in Figure 3 is drawn for floats made from stainless steel, and for liquids whose viscosity is not much greater than that of water. Where viscosities run higher—even up to about 10 times that of water—rotameters can still be accurate, provided that the floats are specially designed for the purpose.

Fortunately, all ARCADIAN Nitrogen Solutions have low enough viscosities at their lowest practical operating temperatures to make for satisfactory usage with practically all conventional rotameters.

ARCADIAN, NITRANA, URANA, URAN and U-A-S are registered trade-marks of Allied Chemical Corporation.



Rotameter calibration for density.

Fluids such as phosphoric and sulphuric acids, and some solutions in the industry get quite "thick" or viscous at cooler temperatures. So much so that they cause considerable error in flow measurement if they are not heated up a little to improve fluidity. ARCADIAN Nitrogen Solutions flow easily at operating temperatures.

Derivation of "CF" Curve

For those who are interested in the derivation of the "CF" (Conversion Factor) curve in Figure 3, here is the equation used:

$$F = \sqrt{\left(\frac{1}{Rf - 1}\right)\left(\frac{Rf}{R} - 1\right)} = \text{Conversion Factor}$$

Rf = specific gravity of the float

R = specific gravity of the flowing liquid

In order to draw a curve with the widest possible application, we have made Rf equal to 8.000, which is a fair value for stainless steel floats. If a float of other material and density is used, simply substitute the actual value for Rf in the formula.

This curve can also be used to find the Conversion Factor for fluids of different density than the one for which the float was designed. For example: suppose we have a rotameter with a float designed for use with NITRANA 3, specific gravity 1.079. The curve tells us that the Conversion Factor is 0.955. Now, if we want to use this rotameter on U-A-S A, specific gravity 0.932, we check the curve and find that F equals 1.04. Then, by computation, we find that: $CF = \frac{1.04}{.955} = 1.09$

This means that when the rotameter reads 20 gpm of U-A-S A, the actual flow is 21.8 gpm. The reason why CF in this case is greater than 1.0 is that the lighter fluid does not lift the float as high as heavier fluid would at the same flow.

If you would like more information on rotameters, or any technical problem involving nitrogen solutions, just write: Technical Service, Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

Benefits of Sulphur in Mixed Fertilizer

It pays to tell farmers about the valuable extra benefits they get from the sulphur you put in your fertilizers. They pay for nitrogen, phosphoric acid and potash. At no extra cost, you give them sulphur which is an important plant food. Many farmers are not aware of this fact. They do not realize the need for sulphur in crop production until serious deficiencies occur.

The fertilizers you make by ammoniating superphosphate are a rich source of sulphur. Normal superphosphate contains more sulphur and more calcium than phosphorus. When you use sulphuric acid to neutralize "excess" ammonia in producing high-nitrogen mixtures, you add sulphur to your fertilizer. And, of course, sulphate of ammonia in fertilizers adds sulphur. On the other hand, concentrated fertilizers made with triple superphosphate and ammonium phosphate are deficient in sulphur.

It is easy to calculate the amount of sulphur your fertilizer contains. *Make this a sales point!* Tell your customers they are getting valuable quantities of sulphur and paying nothing for it except transportation costs. This is an extra bonus.

The shortage of sulphur is becoming critical for crop production on many soils. Crops, on the average, remove about as much sulphur from the soil as they do phosphorus. Cotton, corn, tobacco, legumes, grass, onions and cabbage are heavy users of sulphur.

Crop Response to Sulphur

Field tests in many areas of the country now show definite response of crops to additional sulphur. In Western range tests with native grass, where nitrogen alone produced 1,106 pounds dry weight per acre, nitrogen plus sulphur produced 1,837 pounds dry weight grass per acre.

In Nebraska, corn has shown considerable yield improvement with sulphur. Where average yield was 66 bushels per acre, sulphur alone brought yield up to 72 bushels per acre and sulphur plus zinc increased yield to 77 bushels per acre.

Why Yellow Plants

Corn and other crops lacking sulphur often show pale yellow leaf color, similar to that in nitrogen deficiency. This is because sulphur is needed to produce the essential amino acids that go into making the protein of plant cells.

In Florida, many tests have been made on minor element deficiencies in soils. Since these elements are often supplied as sulphates, additional tests have been run with fertilizers free of sulphur, to determine what elements produced the crop response. Conclusions show that sulphur produced the following increases in yield:

Crop	Yield Increase
Cotton	35%
Corn	40%
Oats	50%
Peanuts	80%
Legumes	60%
Tobacco	40%

In some of these tests, omission of phosphorus had no effect on yield, but omission of sulphur severely reduced yields. In many other parts of the country, too, lack of sulphur in mixed fertilizers, or low per-acre application rates of such fertilizers, will reduce yields seriously in one to three years. With the present urgency to keep yields high to cut production cost per bushel or bale, sulphur should be in the fertilizer every year.

West-coast states have long been using about 750,000 tons of gypsum or calcium sulphate per year as a soil conditioner and source of sulphur. Up to now mixed fertilizers, containing gypsum in regular superphosphate, have been supplying needed sulphur in other areas. When you make high-analysis fertilizers by ammoniating superphosphate with ARCADIAN Nitrogen Solutions, you are supplying farmers needed sulphur for better yields and profits.

Per Cent of Sulphur in Fertilizers made from Ammoniated Superphosphate	
16-8-8	8.5%
15-10-10	7.6%
12-12-12	7.0%
6-12-12	7.3%
4-16-16	6.7%
5-20-20	4.0%
6-24-24	less than 1%
13-39-0	less than 1%

This indicates that sulphur deficiences will show up fast where small amounts of low-nitrogen starter fertilizers are used in the row, without top-dressing, side-dressing or plowdown of balanced mixed fertilizer or superphosphate.

It will pay you to tell dealers and farmers about the sulphur content of your mixed fertilizers. SULPHUR can be a SALES-MAKER for YOU!

Arcadian® NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
DURANA*									
DURANA is a trade-mark of Allied Chemical Corporation.	37.0	13.3	53.4	15.9	9.4	7.2	1.235	0	36
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

*DURANA contains 8% formaldehyde.

Other ARCADIAN® Products: URAN® and FERAN® Solutions • Ammonia Liquor • N-dure® A-N-L® • Ammonium Nitrate • UREA 45 • Nitrate of Soda • Sulphate of Ammonia

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

NITROGEN DIVISION

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Raleigh, N. C., 606 Capital Club Bldg. ..... Temple 3-2801
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Atlanta 3, Ga., 127 Peachtree St., N. E. ..... Jackson 2-7805
Memphis 9, Tenn., 1929-B South 3rd St. ..... Whitehall 8-2692
Columbia, Mo., 1134 Highway 40W ..... Gibson 2-4040
Indianapolis 20, Ind., 6060 College Ave. ..... Clifford 5-5443
Kalamazoo, Mich., P. O. Box 869 ..... Kalamazoo 5-8676
St. Paul 14, Minn., 764 Vandalia St. ..... Midway 5-9141
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NEWS about the TRADE

Armour Shifts Pair

William H. Cover (left) has been appointed midwestern area sales manager of the Armour Agricultural Chemical Co., Atlanta, Ga. He had been Armour's division manager in Jeffersonville, Indiana, and is succeeded in that post by Paul N. Parks (right).

Mr. Cover joined Armour in 1947 and has been division manager in Jeffersonville since 1953. Mr. Parks joined the Armour organization as a salesman in Kentucky in 1950. He has been assistant manager of the firm's Cincinnati division since 1959.

•

AP&CC District Manager

John R. Jones has been named New York-New England district sales manager for the American Potash & Chemical Corp., Los Angeles. His headquarters are in New York.

•

Cranberry Recovery Program

A "recovery program" is in the final planning stages for the cranberry industry, according to Ambrose E. Stevens, executive vice president and general manager of the National Cranberry Association, the cooperative that markets cranberry products under the Ocean Spray brand name.

Mr. Stevens said that the attitude of consumers toward cranberries had changed considerably for the better since last fall when the crop was withdrawn from the market because amino triazole had been improperly used by growers in some areas.

The drive, through Batten, Barton, Durstine & Osborn, Inc., an advertising agency, will start in October and run until Christmas. A feature will be a one-hour network television show.

•

Pesticides Study Expanded

The U. S. Fish and Wildlife Service has begun an expanded study of the relationship of pesticides to wildlife; with emphasis to be put on herbicides and fungicides.

Two Join Potash Co.

Lavoid Holloway (left) and William John have joined the Potash Company of America, Carlsbad, N. Mex., as sales representatives. Mr. Holloway is headquartered in Little Rock, Ark., and covers Texas, Mississippi, Louisiana, and Arkansas. Mr. John is assigned to the midwestern district and covers portions of Missouri, Kentucky, Indiana, and Illinois.

Raw Material Problems To Highlight 1960 Round Table

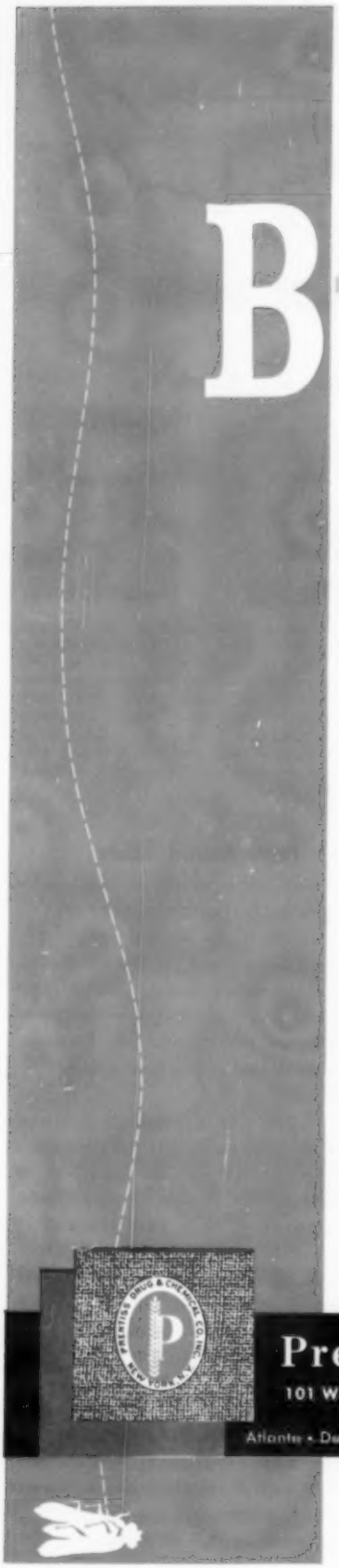
THE 1960 meeting of the Fertilizer Industry Round Table, to be held November 2-4 at the Mayflower Hotel, Washington, D. C., will feature a series of discussions dealing with raw materials in fertilizer manufacture. Fertilizer mixers and manufacturers at past meetings of the Round Table have referred to problems in manufacture due to superphosphate, — these will be among the matters taken up by a panel of fertilizer mixers in a discussion on "Standardization of Raw Materials." Speaking for the suppliers, will be representatives from the phosphate, potash and nitrogen industries on a "raw material producers panel." The discussion on standardization will be introduced by a report by H. L. Marshall, Olin Mathieson Chemical Corp. on "Why Uniformity."

A thorough review of phosphate materials in fertilizer manufacture will open the meeting, with reports on (1) Phosphate rock, — availability, grade and usage; (2) Phosphoric Acid, — types, sources, characteristics, usage, storage and handling; (3) Triple superphosphate problems; and (4) Economics in using phosphate raw materials.

A serious expense in fertilizer production is "In-Plant Shrinkage." This subject will be discussed by Dale Kieffer, Smith Douglass, who has worked on a Task Force dealing with this problem which has been sponsored by the NPFI.

A Panel on "Communication Problems in Instrumentation" will include discussions on new developments in this field, including case histories as reported by several instrument equipment suppliers.

The concluding session will deal with Preneutralization, a topic which stimulated considerable discussion at the 1959 meeting.



Offering a new Insecticide

Butonate

LOW IN TOXICITY • ECONOMICAL

Now available in commercial quantities: a new insecticide called *butonate.** Developed at the University of Wisconsin, it is unique among insect killers in having all of the following properties:

- *Residual action against insects even in light concentrations*
- *Low in toxicity to mammals*
- *Non-staining*
- *Inoffensive odor*
- *Soluble in most organic solvents*
- *Compatible with nonalkaline insecticides and fungicides*

Butonate is a cholinesterase inhibitor. Laboratory tests have proven its effectiveness against household and certain agricultural pests. It may be formulated as an oil spray, an emulsion, wettable powder, or dust.

One formulation, Prentox Pybuton Concentrate, contains 16% by weight butonate, 1.0% piperonyl butoxide and 0.4% pyrethins, combining the residual action of butonate with fast knock-down action while maintaining low toxicity. Butonate is also available as a 25% emulsifiable concentrate, as a 20% oil soluble concentrate, and in a technical formulation containing 95% by weight butonate.

Chemically, butonate is an organic phosphate—0, 0-dimethyl 2, 2, 2-Trichloro-1-n-butyryloxyethyl phosphonate. It is a colorless, somewhat oily liquid, stable in neutral or acidic aqueous solutions, having a (mild) ester odor. Additional information, test data and samples for testing may be secured from us at any of the addresses shown below.

**Butonate's manufacture is licensed by the Wisconsin Alumni Research Foundation under U. S. Patent No. 2927881.*

Prentiss Drug & Chemical Co., Inc.

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Atlanta • Detroit • San Francisco • Los Angeles • Toronto • Montreal • Fort Worth • Pittsburgh • Philadelphia

OK Arsenic On Cotton

The Food and Drug Administration has agreed to permit continued use of arsenic acid as a defoliant and desiccant on cotton until March 6, while studies are made of the possible hazards involved. The question has been before the FDA since shortly before the food additives law became fully effective last March 6. It came up as a result of the passage of the amendment to the Miller pesticide law that last year placed nematocides, defoliants, desiccants, and growth-regulating chemicals under the Miller law.

One of the things that made the question of granting an extension date a little more difficult in this case was the influence of the Delaney clause of the food additives law. Arsenicals are among the compounds that have been barred by the Delaney clause. Tests that have been run by industry, however, have convinced the FDA that no traces of arsenic have yet been discovered in either the meat or milk of dairy cows that have been fed cottonseed meal made from cotton on which arsenic acid has been used. Additional tests are being made to develop more evidence needed to support a petition for clearance of the chemical after the March 6 final deadline date.

•

SE Fertilizer Conference

The fifth Southeastern Fertilizer Conference will be held Oct. 5 and 6 at the Biltmore Hotel in Atlanta, Ga.

A feature of the meeting will be a panel discussion of the topic "What Does Agriculture Need?" Paul T. Truitt, president of the National Plant Food Institute, will preside. Members of the panel include: L. Y. Ballentine, North Carolina Commissioner of Agriculture; Dr. Earl A. Butz, Dean, College of Agriculture, Purdue University; Donald R. Matthews, Congressman from Florida; and W. A. Sutton, director of the Georgia Agricultural Extension Service.

Among other speakers will be: Dr. R. Q. Parks, Grace Chemical Co.; and R. L. Beacher, director of the Southern Region, NPFI.

•

Witco Reassigns Dorsett

Richard H. Dorsett has been appointed southwestern sales manager, with headquarters in Houston, Texas, by the Organic Chemicals Division of Witco Chemical Co., New York. He had been with the division's sales force in Dallas.

The southwestern sales territory is comprised of Texas, Oklahoma, Louisiana, Arkansas, and Mississippi. Robert Stevenson has been transferred from the Houston office to Dallas to replace Mr. Dorsett.

•

Plan Expansion At Brewster

American Cyanamid Co., New York, is planning an addition at its wet-process phosphoric acid plant in Brewster, Fla., that will make possible a doubling of output. The new unit also will provide for an increased tonnage of triple superphosphate.

NFSA Meeting In Memphis

The 1960 annual convention of the National Fertilizer Solutions Association is scheduled for Nov. 9 to 11 at the Peabody Hotel in Memphis, Tenn.

Robert C. Lemler, Aylco Corp., Sullivan, Ill., will speak on "Selling the Farmer"; F. E. Hartzler, Kansas State Teachers College, will discuss management practices; and a panel will review engineering developments. The panel will be comprised of: Morris T. Woosley, West Kentucky Liquid Fertilizer Co., Hopkinsville, Ky.; Dr. John L. Strauss, Ris-Van, Inc., Belmond, Ia.; Dean R. McHard, Kaw Fertilizer Service, Lawrence, Kans.; and Dermot Galbraith, Agriform of Northern California, Woodland, Calif.

Among other speakers will be Roswell Garst of Coon Rapids, Iowa, who will speak on "The Farm Future," and Earl C. Nightingale, who will discuss "Management's Strangest Secret."

International Group Plans Fertilizer Promotion

A $2 million fund to finance a five-year program of expanding and improving the use of fertilizers in crop production throughout the world has been proposed by a panel of fertilizer industry representatives. Contributing to the fund would be fertilizer manufacturers both in the United States and Europe.

The program would operate within the Freedom-from-Hunger campaign of the Food and Agricultural Organization of the United Nations. It was outlined last month in Geneva by the panel which is made up of representatives of the International Potash Institute, the International Superphosphate Manufacturers' Association, the Centre d'Etude de l'Azote, and the Sulphur Institute. Observers were present from the National Plant Food Institute, the Foundation for International Potash Research, and Olin Mathieson Chemical Corp., Baltimore, Md.

The budget evolved by the panel, in collaboration with the FAO secretariat, calls for expenditure of $350,000 in the first year and $450,000 in the second. The program would make an annual contribution of $30,000 to the central operating fund of the Freedom-from-Hunger campaign.

The meeting, in its report to the director-general and to the industry, said that the aim of the program is to stimulate the interest of governments and farmers of less-developed countries in the efficient use of fertilizers and to provide governments with the advice and information necessary for developing national fertilizer programs. It plans to achieve this through a field program of fertilizer tests and demonstrations and through the development of soil testing laboratories and services as a means of improving the use and management of fertilizers throughout the world.

Fruit Fly In California

An oriental fruit fly was discovered last month in a citrus grove near Anaheim, Calif., about 30 miles south of Los Angeles. The fly was found in a fly trap set by county agricultural agents.

William Fritchen, Orange County agricultural commissioner, said that 1,000 fly traps have been set in a 25-square-mile area surrounding the site where the first fly was captured. By late last month, however, no indications of a widespread infestation had been found.

•

Heads Cyanamid Laboratory

Dr. J. H. Ware has been named director of the product research laboratory of the Agricultural Division of American Cyanamid Co., New York. He had been assistant to the manager of research and development.

The Most Powerful

Fumigant

for killing insect pests and rodents

It eliminates infestation of grain, tobacco, plant beds, seeds, dried fruits, cereals, nuts and a wide variety of other products.

Kolker Methyl Bromide economically and quickly kills insects, mites, nematodes and related pests in all stages of their development.

Non-explosive and non-flammable, Kolker Methyl Bromide leaves no residual odors, tastes or stains, when used as directed.

Packaged in one-pound cans, 24 per case for domestic shipment and 48 per case for export. Also available in cylinders of 50, 100, 150 and 450 pound net capacity. It may be ordered as a 100% product or with 2% chloropicrin warning agent.

For further information on this highly effective fumigant write or call us today.

KOLKER CHEMICAL CORPORATION

600 Doremus Ave. • Newark 5, N. J. • MArket 2-4085

NE Fertilizer Group To Meet

The Northeastern Fertilizer Conference will be held at the Hotel Hershey, Hershey, Pa., Sept. 29 and 30. W. H. Garman, Northeastern Regional Director, National Plant Food Institute, will preside over the meeting.

The potential of the non-farm fertilizer market in the Northeast will be discussed by C. R. Skogley, Univ. of Rhode Island, and fertilizer practices in the Northeast will be covered jointly by Dr. J. C. Harper, Pennsylvania State University, and Joseph Troll, University of Massachusetts.

Highway fertilizer practices are to be discussed by H. H. Iurka, New York Department of Public Works, and E. F. Button, Connecticut State Highway Department. Talks by C. F. Winchell, Consolidated Rendering Co., and A. E. Buter, Nitrogen Division, Allied Chemical Corp., are grouped under the topic "Sales Promotion and Advertising."

Other speakers include H. B. Sharer, U. S. Rubber Co., and Dr. Hector Lazo, New York University.

•

Parathion OK For Cole Crops

Growers of cole crops and spinach now can apply parathion insecticide formulations to these crops up to seven days prior to harvest, according to the Monsanto Chemical Co., St. Louis. Previously, the compound could not be applied later than 21 days before harvesting these crops.

•

Chemagro Appoints Earhart

Dr. Robert W. Earhart, research biologist with Chemagro Corp., Kansas City, Mo., has been appointed assistant supervisor in the company's research program.

•

Wilson Elected FARI Head

E. Meade Wilson, area manager in Mulberry, Fla., for the plant food division of International Minerals & Chemical Corp., Skokie, Ill., last month was elected president of the Florida Agricultural Research Institute at its annual meeting in Fort Lauderdale.

Johnny Unitas demonstrates newest H&W high-strength packaging paper . . .

EXPANDA-KRAFT

THE GREAT NEW NAME IN EXTENSIBLE KRAFT

THIS AD IS PRINTED ON EXPANDA-KRAFT WHITE

You can also buy Expanda-Kraft in Semi-Bleached or Natural. Imagine how attractive *your product* would look, packaged in Expanda-Kraft.

To learn how well your product can be *protected* by Expanda-Kraft, see other side . . .

EXPANDA-KRAFT

DEFIES SHOCK!

The bullet passes of Johnny Unitas have the terrific impact to rip through regular kraft (above), yet, thrown at the same speed, they bounce off Expanda-Kraft because of its greater resiliency (left). Johnny Unitas, all-pro quarterback of the Baltimore Colts, demonstrated the toughness of Expanda-Kraft at the National Packaging Show in Atlantic City. Each target consisted of four plies of 50-lb. basis weight stock. Time after time, in standard drop tests, bags made of Expanda-Kraft have proved their superior strength.

Expanda-Kraft is the winner in impact test against regular kraft. Bags of each type were filled with sand, suspended on long ropes, sent hurtling toward each other. Regular kraft bag, photographed at high-speed as it burst, had same ply construction as Expanda-Kraft bag.

EXPANDA-KRAFT REDUCES BREAKAGE It has *two-way stretch*, soaks up shocks that would break ordinary kraft of equal basis weight.

EXPANDA-KRAFT WITHSTANDS MOISTURE *High humidity* and *weathering* have little effect on Expanda-Kraft! It retains its full toughness and firmness.

EXPANDA-KRAFT PRINTS SHARP This advertisement is printed on 50-lb. Expanda-Kraft White from a regular production run. Other shades print as well to enhance sales appeal.

EXPANDA-KRAFT BAGS STACK SECURELY They have a coefficient of friction higher than regular kraft bags, stack with less risk of slippage, stay in place while in transit.

EXPANDA-KRAFT BAGS FILL FAST They meet required porosity standards, yet are rigid enough to stand up to high speeds on the filling line.

CONTACT YOUR MULTIWALL BAG SUPPLIER for information on the use of Expanda-Kraft where rigidity, resilience, strength, moisture resistance and uniformity are required. Expanda-Kraft is made by a new roll-crepe process and is available to multiwall bag manufacturers in 40, 50, 60, 70 and 80-lb. basis weights; White, Semi-bleached or Natural. *Hollingsworth & Whitney, Division of Scott Paper Company, Dept. G, Chester, Pa.*

HOLLINGSWORTH & WHITNEY DIVISION OF
SCOTT PAPER COMPANY

V-C Elects Curtis A. Cox

Curtis A. Cox, general Manager of fertilizer manufacturing at Virginia-Carolina Chemical Corp., Richmond, Va., has been elected a vice president of the firm. He has been with V-C for 24 years.

Starting in 1936 as a shipping clerk in Selma, N.C., Mr. Cox later was promoted to acid foreman and transferred to Rome, Ga. He has been assistant superintendent of V-C's plant at Charleston, S. C., and superintendent at Augusta, Ga. He became assistant manager of fertilizer manufacturing in 1950 and general manager last summer.

•

Apple Growth Regulator

The development of a new chemical growth regulator which protects apples from common scald has been announced by Monsanto Chemical Co., St. Louis, Mo. Trade-named 'Stop Scald" the product is being marketed under the Monsanto label following Food and Drug Administration and Department of Agriculture clearances of the compound as safe and effective for this use.

A post-harvest spray or dip containing as little as two pints of Stop Scald to 100 gallons of water is sufficient, according to Monsanto, to prevent common scald in all commonly susceptible varieties of apples. The active ingredient of Stop Scald is (1,2-dihydro-6-ethoxy-2,2,4-trimethylquinoline).

•

ARS Advances McClellan

Dr. Wilbur D. McClellan has been appointed assistant chief, Crops Protection Research Branch, Agricultural Research Service, U.S. Department of Agriculture.

•

To Build Storage Tanks

Phillips Chemical Co., wholly owned subsidiary of Phillips Petroleum Co., Bartlesville, Okla., is constructing four 15,000-ton-capacity ammonia storage tanks, refrigerated to hold storage temperature at approximately —30 degrees F. at atmospheric pressure on the tanks. Two will be located at the Cactus ammonia plant operated by Phillips near Etter, Texas, and two at the company's East St. Louis, Illinois, terminal on the Mississippi river.

These atmospheric pressure storage tanks will enable Phillips to store large quantities of ammonia at key distributing points during the slack season in order to provide ammonia distributors with an adequate supply during the peak sales seasons.

•

Heads Clark Sales

Charles W. Massie Jr. has been appointed vice-president in charge of sales by Clark Equipment International C. A., the overseas subsidiary of Clark Equipment Co., Buchanan, Mich. He had been general sales manager.

•

Ansul Operations V. P.

Robert W. Reinicke has been named vice president of operations by Ansul Chemical Co., Marinette, Wisc. He had been with Ekco Products, Chicago.

•

SRI New York Office Moves

The Stanford Research Institute's New York office has moved into new quarters at 270 Park Avenue, in the recently-completed, 52-story Union Carbide Building.

Acquire Dutch Interest

Pennsalt Chemicals Corp., Philadelphia, and N. V. Fabriek van Chemise Producten of Vondelingenplaat, Holland, have reached an agreement whereby Pennsalt will acquire a substantial interest in the Dutch chemical firm, known in trade circles as, "Vondelingenplaat."

Among the products made by the Dutch plant, located on the Nieuwe Maas waterway near Rotterdam, are dithiocarbamic derivatives, 2,4-D salts, MCPA, 2,4,5-T, acaracides, nematocides, and sprout inhibitors.

Pennsalt plans to introduce the Vondelingenplaat pesticide line in the U. S., Mexico, and Canada starting in 1961. It is also anticipated that the manufacture of other Vondelingenplaat products will be undertaken in these same countries once the market and economic studies now underway have been completed.

•

OK 658 On Strawberries

Miller 658 Fungicide has been approved by the U. S. Department of Agriculture for use on strawberries to prevent strawberry leaf spot and leaf scorch.

Fertilizer Production Halted At Sewage Treatment Plant

LOS Angeles has halted production of fertilizer at its Hyperion sewage treatment plant and is dumping all sludge into the ocean.

The move renders obsolete about $7 million in equipment less than ten years after it was put into service. It is more economical to do this than continue production, according to Norman B. Hume, director of the Bureau of Sanitation. The fertilizer plant probably will remain in mothballs.

The city now has two long outfalls, pipes reaching five and seven miles into Santa Monica Bay, one to carry off effluent, the other to carry of sludge. Production of fertilizer was discontinued June 30 of this year as wasteful to taxpayers. The city was receiving $4 a ton for its daily production of 90 to 100 tons, while it estimated its cost to produce the fertilizer at $26 a ton.

One of the problems with the fertilizer was its low nitrogen content, making it more a soil conditioner than a true fertilizer. Ironically, the production techniques at Hyperion were changed last spring and experiments were conducted with a different kind of sludge. In a trial run, fertilizer was produced with a nitrogen content of 7.5 per cent, three times the previous content. Sanitation bureau officials, however, were doubtful about the possibility of making a profit with the new product because of the competition from chemical fertilizers.

Bagpak Pallet by International Paper

These tough pallets still do their job after long-haul shipment and months of snow and freezing temperatures.

Trial by weather!

International Paper Bagpak® Pallets survive prolonged storage in snow and severe winter weather with no damage to multiwall bags.

WE DON'T recommend storing Bagpak Pallets in the snow. But when one of our up-state New York customers did, he learned the meaning of *real* protection.

The pallets in our photograph, travel-worn and weather-beaten but still completely serviceable, survived the rigors of shipment, *plus* exposure to winter weather for several months! When they were opened, *every* multiwall bag was safe and uniform. And ready to do its job—no matter how tough.

International Paper pioneered this method of shipping and handling multiwalls. Our pallets now have *four* years of on-the-job experience.

And the Bagpak Pallet has a rigid construction that eliminates transit damage due to abrasion. Plus a square design that means a big saving in storage area.

Sixty-two years of papermaking and materials-handling experience are compressed into every Bagpak Pallet. And these rugged pallets are only part of a *complete* multiwall packaging service offered to you by International Paper — world's most experienced papermaker.

Whatever your multiwall packaging needs, you will find it profitable to talk to your Bagpak packaging engineer. He has complete information. It's yours for the asking.

INTERNATIONAL PAPER
BAGPAK DIVISION • NEW YORK 17, N. Y.

VPI Award To Douglass

Ralph Benjamin Douglass, chairman of the board of the Smith-Douglass Co., Norfolk, Va., last month received the highest award offered by the Virginia Polytechnic Institute School of Agriculture. Mr. Douglass was presented with the 1960 Certificate of Merit, awarded annually to individuals judged to have made the most outstanding contributions to Virginia agriculture.

•

Witco Acquires Sonneborn

Witco Chemical Co., New York, has acquired 100 per cent interest in the privately-owned Sonneborn Chemical and Refining Corp. and its subsidiaries in exchange for 300,000 shares of Witco stock. In addition, three Sonneborn officials have been elected to Witco's board of directors. They are: R. G. Sonneborn, Gustave Schindler, and Dr. Henry Sonneborn III.

•

V-C Dedicates Plant

The Virginia-Carolina Chemical Corp., Richmond, Va., formally dedicated its expanded superphosphate plant at Nichols, Fla., July 20. The plant is named the "Charles Tayloe Harding Concentrated Superphosphate Plant," in honor of Charles T. Harding, V-C's executive vice president who joined the company 43 years ago.

When construction is completed, around Dec. 1, the plant will produce enough phosphoric acid to make about 300,000 tons of concentrated superphosphate. A diammonium phosphate unit also is under construction.

•

Face Fly Spreading

The face fly has been found in six more states so far during 1960, the U. S. Department of Agriculture reported last month. The pest has been found for the first time in Iowa and Missouri—the first finds west of the Mississippi River—and in Connecticut, Maryland, Tennessee, and North Carolina. The fly now occurs nearly everywhere east of the Mississippi and north of Tennessee and South Carolina.

The face fly first was found in this country in New York in 1953 but caused no widespread concern until last year. It is primarily a pest of cattle but also annoys horses and sheep.

•

Proctor Named By Bemis

E. M. Proctor, manager of production for the western operations of Bemis Bro. Bag Co., St. Louis, has been named assistant director of production for the entire company. He joined the company in 1926.

To Build Lime Plant

Dorr-Oliver Engineering, Ltd., Stamford, Conn., has been awarded a contract to design and construct a plant for processing a large, accessible deposit of Ocala (Fla.) limestone at the quarry of Camp Concrete Corp. The plant will be operated by the newly-organized Chemical Lime, Inc. of Ocala. It is being built at Brooksville, Fla.

Preliminary engineering by Dorr-Oliver calls for a dual Dorrco FluoSolids System, with a single-stage reactor for drying the crushed limestone and a multiple stage reactor for calcining.

IMC Fertilizer Clinics To Feature Technical Service

A new series of fertilizer training clinics—this one featuring technical service and production problems—has been scheduled this fall by International Minerals & Chemical Corp., Skokie, Ill.

The clinics will follow the same pattern as the sales training clinics conducted by IMC last year, as a feature of its Full Orbit customer service program. Those two series of 10 meetings drew more than 800 fertilizer industry representatives.

Technical and production help has been high on the list of customer requests as a natural followup to sales training, according to IMC officials. The company established a full-line technical service staff last year. Equipped to handle the complete range of fertilizer manufacturing problems, rather than specializing in a single product, the staff is organized on a regional basis and has made more than 600 service calls since January.

Production training meetings will open October 24-25 in Minneapolis, and conclude December 14-15 in Jackson, Mississippi. Other locations for the two-day meetings will be Indianapolis, Baltimore, New York, Raleigh, N. C., Toledo, Ohio, Winter Park, Florida, Montgomery, Ala., Kansas City, Mo., and Tyler, Texas.

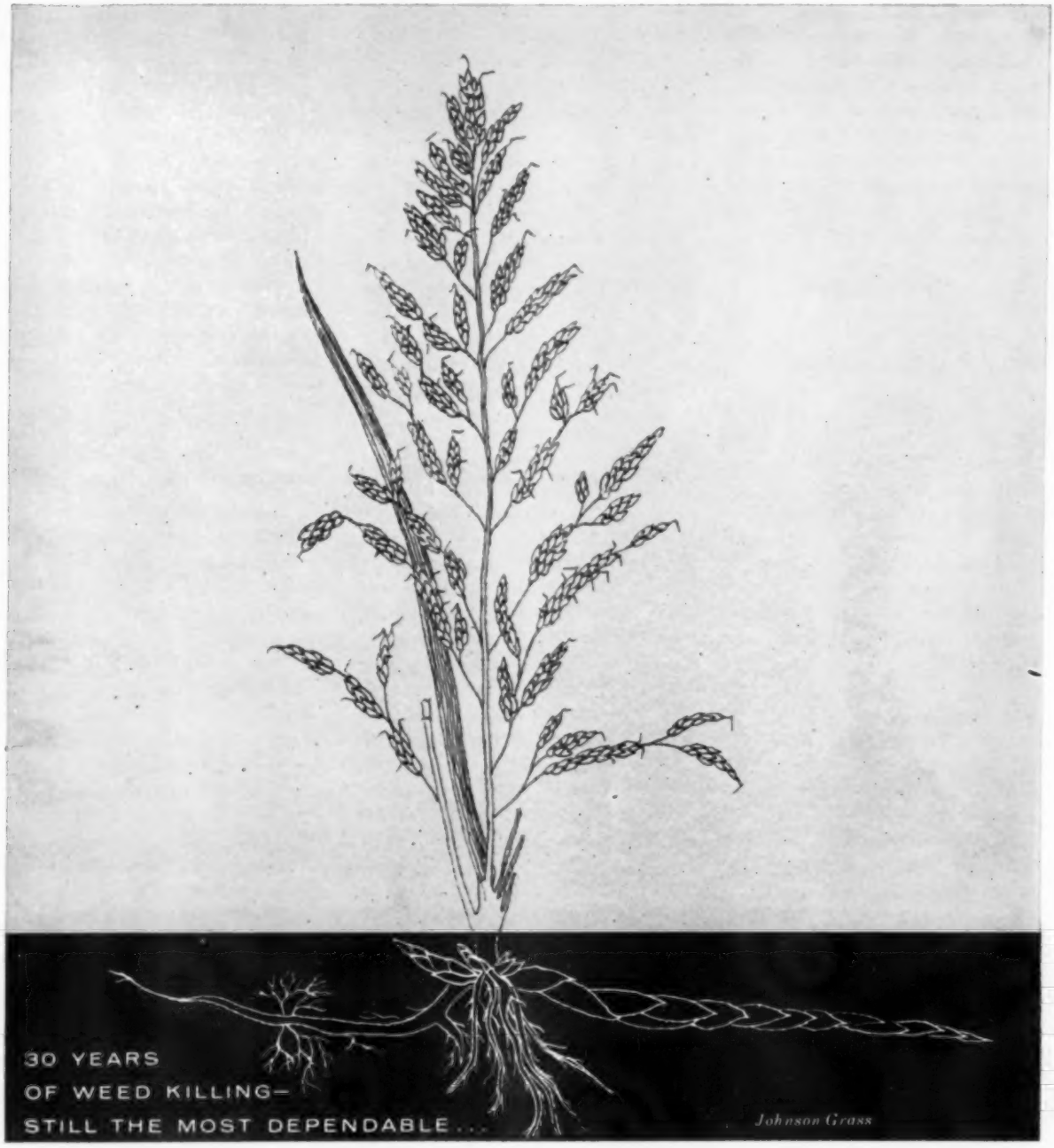
Among subjects to be covered are fertilizer shrinkage, scrubbing and dust control, handling of liquids including all acids and nitrogen sources, sizing of raw materials, quality control, plant maintenance, specialty fertilizers, and supervision.

Richard G. Powell, IMC technical service manager, will take part in all 11 meetings. Neal Schenet, IMC manager of merchandising, will be moderator.

Technical service staff members from each region will be on hand for presentation of problems peculiar to their particular sections of the country.

Meeting dates and sites:

October 24-25 — Minneapolis (Pick-Nicollet Hotel)
October 26-27 — Indianapolis (Marott)
November 9-10 — Baltimore (Lord Baltimore)
November 14-15 — New York (Park-Sheraton)
November 16-17 — Raleigh, N. C. (Scandia Village)
November 21-22 — Toledo, Ohio (Commodore Perry)
November 28-29 — Winter Park, Florida (Langford)
November 30-December 1 — Montgomery (Whitley)
December 5-6 — Kansas City, Missouri (Muehlebach)
December 12-13 — Tyler, Texas (Carlton)
December 14-15 — Jackson, Mississippi (Jacksonian)



OLDBURY® SODIUM CHLORATE

When chemicals are used, Oldbury sodium chlorate is *still* the most dependable way to *destroy* weeds.

It kills them all.

It's the most inexpensive way, too. For a mere 25¢, you can sterilize 100 square feet of drainage ditch, fence line or roadway for *at least* a year.

Open-head drum empties faster. Oldbury sodium chlorate comes in a fast-opening drum. A single lever seals and reseals the drum with a metal band. Full open head makes pouring, scooping, or shoveling easy.

Available in 50-, 100- and 450-lb. sizes.

Technical aid. Full-time Hooker agronomists can help with weed control plans and advise on handling, storing, and using sodium chlorate.

Write for descriptive bulletin on how these men can help you.

HOOKER CHEMICAL CORPORATION

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HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

Potato Sprout Inhibitor

Columbia-Southern Chemical Corp., Pittsburgh, Pa., is marketing a potato sprout inhibitor containing Chloro IPC. The new product, known as Sprout Nip, is applied to potatoes as an aerosol suspended in the air stream that is circulating through potatoes stored in bulk or pallet boxes, but not those stored in burlap bags.

Application also can be made directly on the grading table after storage, provided the potatoes are thoroughly healed with thick skins and are handled gently following the treatment. Sprout Nip will be commercially available for the fall potato harvest and is being marketed as a service by trained applicators.

•

Tracy Joins W. R. Grace

Osgood V. Tracy, formerly president of Esso Standard, division of Humble Oil & Refining Co., affiliate of the Standard Oil Co. (New Jersey), has been elected a director and executive vice-president of W. R. Grace & Co., New York. Mr. Tracy fills the post held by the late Marlin G. Geiger, who died May 13.

He is in charge of the chemical business of Grace and is responsible for the seven operating divisions as well as the Research division comprising the Grace chemical group.

•

Sheep Footrot Spray

The Veterinary Science Division of Boots Pure Drug Co., England, has introduced an aerosol spray to control footrot in sheep. Called Pedrite, it is made up of a bactericide, dichlorophen, and a coloring agent which shows exactly the area of the hoof covered.

•

Monsanto Names Two

Edward B. Seaton and James A. Singmaster Jr. have been appointed assistant general managers of Monsanto Chemical Co.'s overseas division. Mr. Seaton had been director of operations for the overseas division and Mr. Singmaster was a member of the company's corporate planning staff.

•

Barrett Joins Thompson

W. L. Barrett has joined the sales staff of Thompson Chemicals Corp., St. Louis, Mo. Mr. Barrett fills a newly-created post of cooperative specialist. For the past 12 years, he has managed the Agricultural Chemicals division for Consumers Cooperative Association, Kansas City, Mo. Prior to joining Consumers Cooperative, Mr. Barrett taught agriculture.

•

Scott Joins Cyanamid

Dr. Harry E. Scott has joined the agricultural division of American Cyanamid Co., New York, as an entomologist and will be primarily concerned with special insecticide development problems. For the past seven years, Dr. Scott had been extension entomologist with North Carolina State College.

•

New Screwworm Research

New research on the screwworm will begin soon at the Kerrville, Texas, station of the U. S. Department of Agriculture. The work is being financed by a $200,000 supplemental appropriation recently approved by Congress.

The new research will be under the direction of Dr. Raymond C. Bushland and will be aimed at developing better methods of rearing screwworms and finding ways to produce strains of the insect better suited for sterilization by irradiation.

•

Acting Area Supervisor

John S. Sullivan has been named acting northeast area supervisor of agricultural chemicals sales for Monsanto Chemical Company's Organic Chemicals Division.

Mr. Sullivan formerly served as a sales representative with the division's district sales office in St. Louis. He will fill in for Charles A. Leonard, northeast area supervisor, who is on leave of absence due to illness.

SCI Elects Officers

Newly-elected officers of the American Section, Society of Chemical Industry are: William H. Lycan, Johnson and Johnson, Inc., chairman; Robert W. Cairns, Hercules Powder Co., vice chairman; and Frank C. McGrew, E. I. du Pont de Nemours & Co., honorary secretary.

New members of the executive committee are: D. K. Ballman, Dow Chemical Co.; D. B. Benedict, Union Carbide Corp.; K. J. Brunings, Chas. Pfizer & Co.; H. K. Nason, Monsanto Chemical Co.; and G. A. Nesty, Allied Chemical Corp.

•

IMC Advances Two

Dick Lentz has been named sales supervisor of the Mason City, Iowa, district and George Donaldson has been appointed superintendent of the Fort Worth, Texas, fertilizer plant by International Minerals & Chemical Corp., Skokie, Ill.

Mr. Lentz joined IMC three years ago. Mr. Donaldson has been with the company for seven years.

•

William Gerlach Dies

William Gerlach, Sr., a former vice president of the Berkeley Chemical Co., Berkeley Heights, N. J., died recently following a brief illness. He was 71.

•

Prescott Joins Raymond

Fitzhugh Prescott recently joined Raymond Bag Corp., Middletown, Ohio, as salesman in the midwestern district. He previously represented International Paper Co., Bagpak Division, and for the past several years, McLouth Steel Corp., Detroit, Michigan. His headquarters are in Detroit.

•

Garden Trade Show

The 1960 Mid-America Lawn, Garden & Outdoor Living Trade Show will be held Nov. 13 to 15 at the Navy Pier in Chicago. Approximately 150 concerns are expected to be represented with displays at the show.

NOW! FOR INCREASED MOISTURE RESISTANCE and thinner coatings...

USE MULTIWALL BAGS WITH *New* HIGH-DENSITY POLYETHYLENE COATINGS

IDEAL FOR PACKAGING

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PESTICIDES
AMMONIUM NITRATE
AND OTHER FERTILIZERS

Because of a major breakthrough in resin technology by Union Carbide, chemicals and other agricultural products may now be packaged in Kraft multiwall bags coated with BAKELITE *high-density* polyethylene.

In addition to providing equal or better moisture resistance than low-density coatings approximately *twice the thickness**. . . laboratory tests at Union Carbide show that high-density coatings provide greater interior abrasion resistance and are *20 times* more effective than low-density coatings of the same thickness as a barrier to greases and high penetrating oils. And, multiwall bags coated with high-density polyethylene can be used on standard bagging and closure equipment.

For further information, see your packaging supplier, or write: Dept. DD-2, Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York. *In Canada:* Union Carbide Canada Limited, Toronto 12.

* Determined in a 360-hour moisture pickup test conducted by International Paper Company on 50-lb. Kraft bags, polyethylene coated, and filled with *calcium chloride*.

UNION CARBIDE

BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

Importance of Fertilizers Outlined at Grade Hearing

VALUE OF SOIL FERTILITY PROGRAM STRESSED

THE 1960 Southwestern Fertilizer Conference and Grade Hearing attracted over 260 industry representatives, college personnel, and control officials to the Galvez Hotel in Galveston, Texas, on July 27-30.

The general session was presided over by Stanley Hackett, chairman of the Southwestern Fertilizer Conference Committee. Dr. R. L. Beacher and W. R. Allstetter of the National Plant Food Institute opened the program with a discussion of NPFI activities both nationally and regionally. They introduced E. K. Chandler, who will soon assume duties as Southwestern District Representative in Shreveport for the NPFI. Mr. Chandler has been located in Knoxville, Tennessee, representing the Institute in the States of Tennessee, Alabama, and Mississippi.

Dr. M. B. Sturgis, Head of the Department of Agronomy at LSU, outlined the importance of fertilizers to Louisiana agriculture. He pointed out that Louisiana had a deficit of over 31,000 tons of plant food nutrients in 1959, comparing tons of nutrients supplied with those removed by all crops and pastures. He said that fertilizer consumption in Louisiana would be increased almost threefold if harvested crop acreage was increased to a reasonable three and one-half million acres and farmers followed minimum fertilizer recommendations of the Louisiana Experiment Station.

C. B. Spencer of the Texas Cottonseed Crushers Association said that nearly one half of the six million acres of Texas cotton received no fertilizer last year. He noted that the opportunity for increased fertilizer use is greatest in the Blackland and in Central Texas, not in West Texas where fertilizer use already is near economic optima. Mr. Spencer outlined a new educational program directed to Texas cotton farmers and said that cotton growers who consistently make high yields of good quality cotton and, also, the most income are those who follow a proven route which includes adequate use of fertilizer. He added "we don't feel we have any possibility of getting our farm income on the right track without more fertilizer."

Dr. John E. Hutchison, director of the Texas Extension Service, outlined the progress of the Texas intensified soil fertility program which started in the fall of 1959. He noted that the number of soil samples processed this year for the thirteen counties jumped 300% over the previous year. Economists will evaluate the adoption of improved practices at the end of this growing season. A new soil testing laboratory will soon be in operation at Lubbock to serve the West Texas area, Dr. Hutchison noted. Commenting on the potential income for the state, Dr. Hutchison said that the use of better fertilizer practices would play as significant a role as anything he could think of. He said that Texas farm income could be increased by $250 million over the present $2-½ billion through effective statewide intensified soil fertility programs.

Woody N. Miley, Arkansas Extension Soil Specialist, told how Arkansas' demonstration and intensified soil fertility program led to a boost in fertilizer consumption of 9% during 1959-60 in the five county intensified area. Consumption for the state as a whole climbed only 2.7%. Primary plant nutrient consumption soared 13% in the five counties, and 6% for the entire State. In Lawrence, one of the original intensified counties, soil samples more than doubled and total plant food use increased 40% since 1958.

Enoch Nix, vice-president of the American Bank of Boosier City, Louisiana, told the conference that the farmer who uses fertilizer properly is a better credit risk. He said that loans for fertilizer usually are better for farmers than any other farm production item and these loans provide bankers with an opportunity to protect their investments. Applications for farm production loans should require a comprehensive management plan for the farm, with anticipated costs and returns, and a well-planned soil fertility program.

The keynote speaker for the morning program was Ralph Everett, director of Empire Sales Training Company in Miami. Mr. Everett emphasized that farmers should be sold on the basis of what fertilizer can do for them in terms of increased net profits, rather than on the basis of price alone.

In the Friday morning session, fertilizer control officials and land-grant college representatives from Arkansas, Louisiana, New Mexico, Oklahoma, and Texas reported on the fertilizer grades approved for the coming year and consumption figures for the 1959-60 year to date. In Arkansas, total fertilizer consumption moved up to 362,000 tons in 1959-60 from 353,000 in 1958-59. Louisiana showed a 1% increase in total tonnage for the nine month period of September through May, and an 11% increase in use of approved fertilizer grades. Oklahoma's 1959-60 tonnage was up to 145,000 from 133,000 last year.

The conference will again be held in the Galvez Hotel next year on July 19, 20, and 21, 1961.★

Diamond Appoints Egolf

Charles P. Egolf has been appointed assistant manager of Diamond Alkali Co.'s southeastern sales office in Memphis, Tenn. He joined Diamond in 1953 as a field salesman.

•

Amm. Nitrate Cuts Atlas Profits

The Atlas Powder Co., Wilmington, Del., last month revealed that, while its sales were up 2 per cent during the first half of 1960, earnings dropped by 16 per cent. Atlas president Ralph K. Gottschall attributes the decline to a continuing drop in sales and profits of the company's explosives div.

The increasing use of low-cost ammonium nitrate as an explosive is largely responsible, Mr. Gottschall points out, along with a slackening in heavy construction activities.

•

Southern Nitrogen Acquires

Southern Nitrogen Co., Savannah, Ga., has completed plans to acquire Millhaven Sales Corp., which operates anhydrous ammonia distribution and application facilities in Georgia. Southern Nitrogen expects the new subsidiary will make possible an increase in sales of anhydrous ammonia for direct application.

•

Maschoff Succeeds Carroll

John M. Maschoff Jr. has been named district sales manager of the plant food division of International Minerals & Chemical Corp., with headquarters at Winston-Salem, N. C. He succeeds John F. Carroll, who retires Oct. 31 after 42 years of service with IMC.

For the past two years, Mr. Maschoff has been sales supervisor at Winston-Salem. He joined IMC in 1954.

•

Siegel Is Hudson V.P.

Richard L. Siegel has joined the Hudson Pulp and Paper Corp., New York, as vice-president in charge of marketing for its industrial products group. Mr. Siegel is in charge of sales of the multiwall bag, paper merchant and bulk divisions.

•

AP&CC Names Young, Morgan

William W. Young, left, has been appointed southern area regional sales manager for American Potash & Chemical Corp., Los Angeles. Mr. Young will open the company's first regional headquarters at Atlanta, Ga., in the near future and will have sales and administrative responsibility for the Atlanta and Shreveport district offices.

Niven D. Morgan Jr., right, formerly sales representative at Shreveport, replaces Mr. Young as district manager at that office.

•

Direct Phosphorus Method

Edgar M. Queeny, chairman of the finance committee of the Monsanto Chemical Co., St. Louis, Mo., has been granted a patent on a method for the direct use of liquid phosphorus as a fertilizer. His patent is assigned to the company.

Phosphorus burns spontaneously upon contact with air, but, according to the patent, can be safely injected as a liquid into the earth, where it solidifies and slowly combines with oxygen. Mr. Queeny reports that the liquid phosphorus will not interfere with the germination of seeds or the growth of plant roots if it is applied an inch or more away from them. It also should be released, he said, at least two inches below the surface.

The equipment described in the patent (No. 2,947,269) can be mounted on or pulled by a tractor. Hot water circulating through the tank jacket keeps the phosphorous liquid, and it is discharged through the ground behind the cutting blade of a plow. A conventional planter can be made part of the machine.

The company has not promoted the method because, at the present, it can't compete for the farmer's dollar on a cost basis.

CFA Offers Scholarships

Two new annual cash scholarships will be offered to students in soils, crops, and related subjects, at Fresno State College and Chico State College, by the soil improvement committee of the California Fertilizer Association.

The scholarships, in the amount of $100 each, will be awarded annually beginning with the 1960-61 school year, to one student at each of these colleges.

•

IMC Property Manager

Dr. Allen T. Cole has been appointed property manager for the Florida and Tennessee phosphate operations of International Minerals & Chemical Corp., Skokie, Ill. Dr. Cole is in charge of acquisition of land reserves, utilization of properties prior to mining, and reclamation of mined-out areas.

For the past five years, he has operated a minerals consulting office in Lakeland, Fla.

•

To Enlarge Florida Center

Swift & Co., Chicago, plans to construct a new phosphoric acid producing plant at its phosphate center, south of Bartow, Fla. The plant will double Swift's production of phosphoric acid.

•

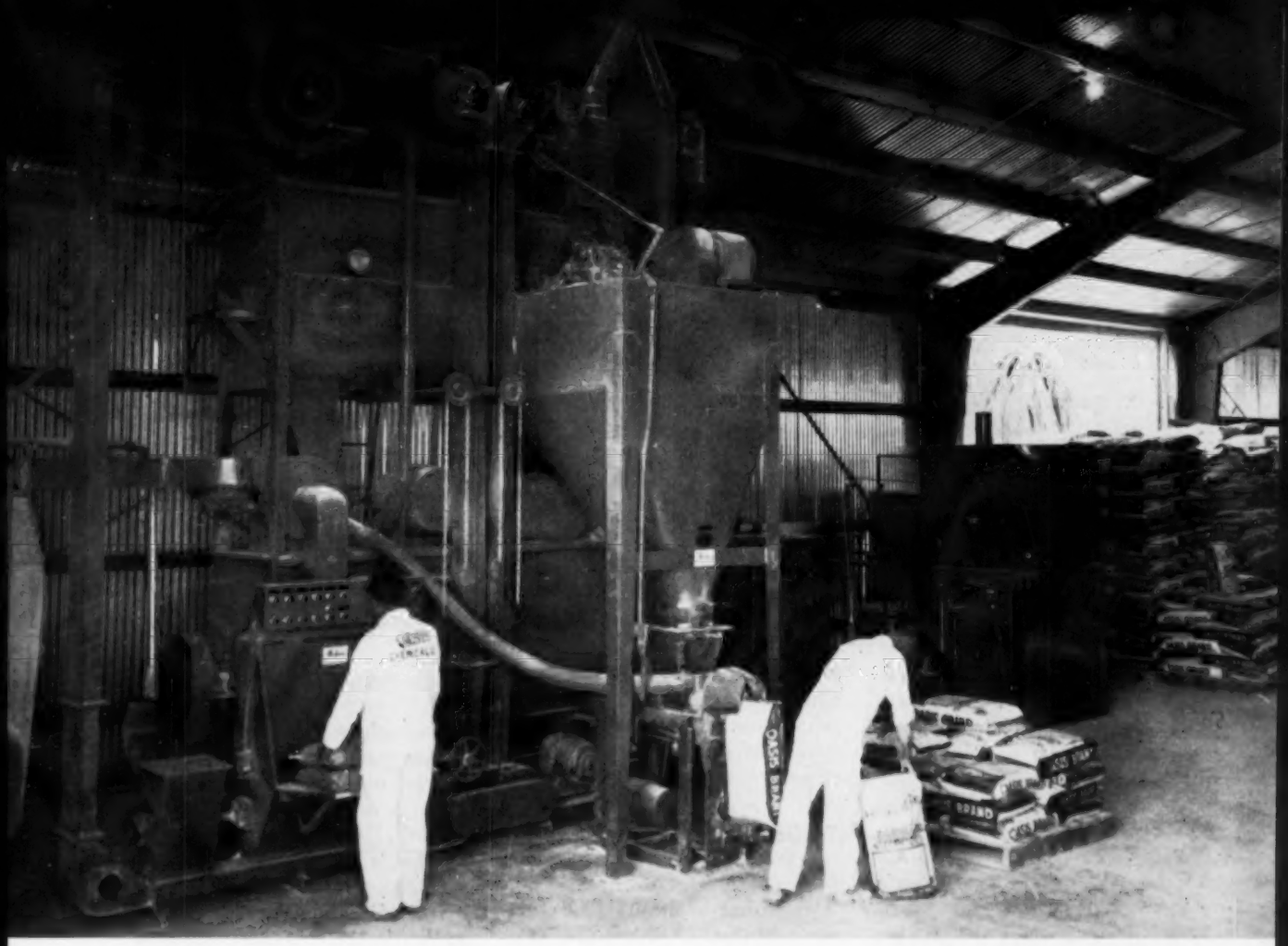
V-C Sales Manager

John L. French, who has been a fertilizer salesman and manager for the Virginia-Carolina Chemical Corp., Richmond, Va., for the past 33 years and assistant general sales manager for the past two years, has been named general sales manager of the fertilizer division of V-C. He succeeds A. P. Gates, who recently was elected vice president.

•

Reduce Polyethylene Prices

Union Carbide Plastics Co., division of Union Carbide Corp., New York, has reduced its prices on low-density polyethylene. Reductions range up to five cents per pound and apply to practically all types of "Bakelite" brand polyethylene resins and compounds made therefrom.



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In the field of fertilizers and insecticides. the Poulsen Uni-Blender is our standard unit—a plant that's *Ready-To-Run. It mixes, elevates, grinds, and bags. Impregnates liquids with diluent mixes.

If your product deteriorates from long delays in shipping, you want to deliver a fresh product . . . the Uni-Blender can do it!

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This unit can handle four to six, 1200 to 1500 lb. batches of field strength dust per hour. Other capacities are available.

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Mathieson Chemical Corp.	Phoenix, Arizona
Niagara Chemical Div. (FMC)	Richmond, Calif.
Miller Products Co.	Portland, Ore.
Stauffer Chemical Co.	Richmond, Calif.
American Potash & Chemical Co.	Los Angeles, Calif.
Cotton States Chemical Co., Inc.	West Monroe, La.
Pennsalt Mfg. Co. of Wash.	Portland, Oregon
Thompson-Hayward Chemical Co.	Lubbock, Texas
Tide Petroleum Prod. Co.	Edenburg, Tex.
Diamond Alkali Co.	Cleveland, Ohio

EXPORT

Pennsalt International Corp.	Mexico City
Stauffer de Mexico, S.A.	Culiacan, Mexico
Niagara Chemical Division	Culiacan, Mexico
Tropical Agriculture, S.A.	Havana, Cuba
Geigy De Brasil, S.A.	Rio De Janeiro, Brazil
DuPont (Peru) S.A.	Callao, Peru
Compania De Petroleo Shell de Columbia	Barranquilla, Colombia
Allied Chemical Services Ltd.	Calgary, Canada
Alianca Commercial De Anilinas	Sao Paulo, Brazil
Bayer Agro Chem Corp.	Bombay, India

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75 German Farmers Study United States Methods

Seventy-five farmers from West Germany recently visited the United States for three weeks to study and observe modern agricultural methods. The visit was motivated by the German farmers' interest in the vertical concept of farming.

A. O. Smith International S. A., a wholly-owned subsidiary of the A. O. Smith Corp., Milwaukee, and Mannesmannregner, Dusseldorf, Germany, acted as guides for the tour. The group toured farm operations in Illinois, Iowa, Minnesota, and Wisconsin. A few of the visitors are shown here sampling Wisconsin cheese at a picnic. Miss Ursula Bujanovich, A. O. Smith International, is holding the cheese.

New TVA Process Developed

Charles H. Young, manager of chemical engineering, Tennessee Valley Authority, reports that TVA engineers are developing a new process for the production of granular diammonium phosphate fertilizer.

"The process has an advantage over the previously-developed crystallizer method in that it can use low-cost, wet-process phosphoric acid without a purification step," he said. The grade of the product depends on the purity of the phosphoric acid available, ranging up to 21-53-0 when electric-furnace acid is used.

•

Increase Ammonia Capacity

Ammonia production capacity has been increased by 17 per cent, and anhydrous ammonia storage capacity will be expanded at the Tuscola, Ill., plant of U. S. Industrial Chemicals Co., division of National Distillers and Chemicals Corp.

The plant is operating at the expanding rate of 70,000 tons per year and a 6,000 ton storage facility will be in service by the end of the year.

•

Hansen Joins Great Western

Lee R. Hansen has been appointed manager of the agricultural chemicals department for the West Coast by the Great Western Chemical Co., Richmond, Calif. Mr. Hansen, who has spent 15 years in the agricultural chemicals sales field, previously was with L. H. Butcher Co., Olin-Mathieson Chemical Corp., and the U. S. Borax and Chemical Corp. His headquarters are in Portland, Oregon.

•

To Dow Washington Office

Winfield W. Sunderland has been named staff assistant in the Agricultural Chemicals Department of Dow Chemical Co., Midland, Mich., and is assigned to the company's Washington office.

Mr. Sunderland will coordinate Dow agricultural chemical activities with government regulatory agencies. For the past six months, he has been on special assignment with the National Agricultural Chemicals Association in Washington. He joined Dow in 1934.

•

Malaya Seeks Fertilizer

The Malacca Chamber of Commerce, Federation of Malaya, is interested in bagged ammonium sulfate fertilizers from the United States for direct shipment to the Port of Malacca for use on rubber estates. The Chamber indicates it can purchase 500 tons monthly, if prices are competitive with European and Japanese fertilizer now used. They also are interested in smaller quantities of crushed phosphate rock and urea.

The difficulty lies in limited port facilities and the necessity of moving cargo from vessels to shore on lighters. No U. S. vessels now call at Malacca. U. S. exporters, however, may wish to send quotations to Goh Keng How, president, Malacca Chamber of Commerce, 89 Wolferstan Road, Malacca, Federation of Malaya.

•

Hathaway Named By Allied

Norman E. Hathaway has been appointed executive vice president of Allied Chemical's Nitrogen Division. He had been assistant to the president of Nitrogen Division since Jan. 1, 1960, and previously was vice president of Oronite Chemical, a subsidiary of Standard Oil of California.

•

Tours Pyrethrum Region

A two-month tour of Africa's pyrethrum growing regions recently was completed by Dr. Herman Wachs, research scientist for Fairfield Chemicals, Food Machinery & Chemical Corp., New York. Dr. Wachs is the developer of the synergist, piperonyl butoxide.

Despite the growth of African nationalism, Dr. Wachs said that pyrethrum exports to the U. S. will continue to have an important position in the economy of pyrethrum-growing countries.

•

To Discuss Registration

Dr. J. T. Thurston, manager, research and development, Agricultural Division, American Cyanamid Co., New York, will discuss the pesticide registration situation at the annual convention of the Western Agricultural Chemicals Association, Sept. 24 to 26, at the Palm Springs Riviera, Palm Springs, Calif.

Other speakers will be Joseph E. Burger, sales manager, S. V. Nootbaar & Co., Pasadena, Calif.; and Dr. Virgil H. Freed, department of agricultural chemistry, Oregon State College. Mr. Burger will discuss salesmanship, while Dr. Freed's subject is to be "Agricultural Research — What Should It Be?"

To Expand Potash Operations

American Metal Climax, Inc., New York, plans to spend nearly $3 million for expansion of the Southwest Potash Corp. facilities in Carlsbad, N. Mex. This will be the second expansion step taken by Southwest Potash since its mine and mill were brought into production late in 1952. The last increase in capacity was made in 1955. Southwest Potash is a division of American Metal Climax.

In another move, American Metal Climax announced plans to build a $7 million plant in Vicksburg, Miss., that will employ a new process to produce nitrate of potash.

•

Rohm & Haas Names Hayes

Rohm & Haas Co., Philadelphia, has appointed Walter B. Hayes as manager of the company's Knoxville, Tennessee plant to take the place of Mr. Kenneth R. Kaiser who died recently. Mr. Hayes formerly was production manager at the plant.

In addition, Enno T. Sauer will be transferred from the production control group in the Philadelphia office to the Knoxville plant to serve as assistant plant manager within a few months.

•

8 Companies Join NPFI

Eight companies recently were voted into membership in the National Plant Food Institute. The new members are: Central Resources Corp., New York; Crystal Chemical Co., South Sioux City, Nebr.; Goodpasture Grain & Milling Co., Brownfield, Texas; and Kickapoo Valley Chemical Co., Atlanta, Ill.

Also: Minnesota Liquid Fertilizer Co., Minneapolis, Minn.; Phinneys, Larned, Kans.; Plainsman Fertilizers, Inc., Plainview, Texas; and Tri State Fertilizer Co., Burlington, Iowa.

•

Velsicol Offers Gifts

Velsicol Chemical Corp., Chicago, is offering free gifts and cash prizes to all garden dealers who displayed Chlordane insecticide by Sept. 1. To get his free gift, a dealer simply mails a snapshot of his display to Velsicol. In addition, cash prizes will be awarded to outstanding displays.

•

Yale Representative

Pacific Lift Truck Co., Los Angeles, has been appointed Yale representative in Southern California by Yale Materials Handling Division, The Yale & Towne Manufacturing Co., Philadelphia.

221 TVA Licenses Issued

The Tennessee Valley Authority reported last month that 37 licenses for the use of TVA-developed fertilizer processes or for the manufacture of equipment were issued during fiscal year 1960. This brought to 221 the total number of licenses that have been issued to 167 companies for use in about 230 plants.

Of this total, 111 have been issued for use of the ammoniator-granulator or for its manufacture.

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Equipment, Supplies, Bulletins

General Metals Spreader

General Metals, Inc., Greensboro, N. C., now is manufacturing a line of bulk fertilizer spreaders under a licensing agreement with the Even Spread Co., Owensville, Ohio. The power spreaders manufactured by General Metals are identical to those produced at Owensville. Among the features of the truck are distributor tubes which provide even spreading of the material and a chain and slot conveyor, in the bottom of the body, which is driven by the power take-off through a transmission, speed reducer, and roller chain.

•

Seed Treatment Device

Morton Chemical Co., Chicago, has introduced a simplified liquid seed treatment device that permits farmers to treat seed while it is being moved from bin to bin, or from bin to wagon. The applicator, called Pandri-Meter, consists of a one-inch plastic bottle cap equipped with a length of small hose and an automatic air intake control. When attached to a bottle of liquid seed treatment, the device accurately meters the liquid at the desired amount per bushel.

•

Stauffer Chemicals Booklet

Stauffer Chemical Co., New York, has prepared a 64-page booklet describing its many chemical activities. The title of the booklet, "Stauffer Chemicals . . . . Everywhere," reflects the theme of the publication that, although few Stauffer products meet the consumer's eye, they are included in a tremendous number and range of consumer goods.

•

Simplified Soil Test Kit

Edwards Laboratory, Norwalk, Ohio, is offering a simplified test for soil acidity in the form of a Soiltex kit. When using the kit, a small quantity of soil is shaken with a few drops of the Soiltex solution in a paper boat. The reaction of the soil is obtained by comparing the color of the liquid with a Soiltex color chart.

Complete directions and explanations as well as a list of common plants classified according to their soil reaction preferences are included in each kit.

o

B-I-F Feeder Bulletin

B-I-F Industries, Providence, R.I., has prepared a four-page bulletin that describes its new Omega table feeder. Among the features described are: variable speed transmissions; continuous, uniform discharge; and large hopper capacity.

•

Mechanical Soil Pulverizer

With a new machine developed in the soils laboratory at the University of Wisconsin's College of Agriculture, Madison, samples of soil can be prepared for analysis in a minute or less. The invention accomplishes the job of deaggregating the soil to desired and uniform mesh sizes without crushing or "powdering" the individual soil crystals.

Wisconsin soils authorities state that one operator can process more than 100 soil samples in a single hour with the specially developed, power-driven machine. The Nasco-Asplin Soil Pulverizer, named for its manufacturer and its inventor, James Asplin, is described as a mechanized mortar and pestle by the Wisconsin Alumni Research Foundation, to whom the patents have been assigned by Mr. Asplin. The foundation has licensed National Agricultural Supply Co., Fort Atkinson, Wisconsin, to manufacture and distribute the invention.

Vibrating Feeder Bulletin

Link-Belt Co.'s new Straightline vibrating feeders which incorporate a new principle of vibration for high-capacity, controlled feeding of heavy and abrasive bulk materials are described in Folder 2770. Two models of the feeder are available in 30 sizes. The booklet is available from the company at Prudential Plaza, Chicago 1, Ill.

•

Fork Truck Catalog

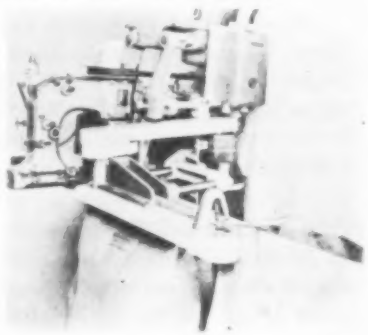
A new catalog (SS-1665), which illustrates and describes the Model A-5 Baldwin-Clark weighing attachment for fork trucks, is being offered by the Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich.

The electronic weighing attachment makes possible the in-transit weighing of loads by fork trucks and eliminates the need for weighing loads at platform scales.

•

New Sewing Attachment

Bemis Bro. Bag Co., St. Louis, has developed a sewing attachment that is said to simplify and speed the closure of multiwall paper shipping bags. The Sew-Rite attachment, which is mounted on the sewing pedestal, permits the bag to adjust itself properly before engaging the sewing machine, consumes less operator time by actually carrying the bag to the sewing machine, and reduces thread and needle breakage due to improper handling of bag by operator during the sewing operations.



1960 Pesticide Sales Picture (*From Page 30*)

More Stable Market Seen For BHC

Over the past ten years, demand for BHC has contracted year by year as other pesticides made inroads into the cotton insecticide market. BHC lost ground in this competition because it was not adequately promoted, and because the farmer continually looks for a new and what he hopes will be a more effective product.

However, just as BHC is not perfect, the consumer has come to realize that the newer insecticides have their faults, too. With a reevaluation of all insecticides, demand for BHC will stabilize, and sales forecasts will be more dependable.

This season, although prices were down, we have seen a firmer market for BHC and more realistic terms to the formulator have given this product a healthier aspect. Formulators have been more careful in estimating their requirements, carryover inventories should be less than in previous years, and the tone of prices should show improvement.

During past years, the characteristics of technical BHC have improved, too. The gamma isomer content of the product has been increased and held more constant through the season's production period. We have seen improvements in BHC's flowability and with it, better grinding characteristics. Because it is one of the most economical of all insecticides for the cotton producer, we feel that BHC has a sound future for use both in the U. S. and abroad.

Cyanamid (*From Page 30*)

which will pay him to buy and use them. It was an interesting experience for our company to find in 1960 that, in spite of the cranberry episode last fall, amino triazole sold very well this season, particularly in the midwest, for use on Canada thistle. This demonstrated to us that amino triazole is still a good product, and that the farmer will buy and use a good product regardless of adverse publicity.

As a new product, Thimet has done exceptionally well. Upon initial introduction in the midwest in '59, Thimet proved effective for controlling early-season insects on potatoes. In 1960 its use by potato farmers was considerably expanded. Thimet was also dramatically successful in the control of aphids on sugar beets. Early in the year we sent a rush shipment of Thimet 5% Granular by air to the Imperial Valley of California where it helped save the sugar beet crop there.

Cyprex, another new Cyanamid product, was well received in all the important apple, cherry, pear and pecan areas where it was highly successful in aiding the control of apple and pear scab, cherry leaf spot and scab on pecans.

Poor Mississippi Season: Weather The Reason

JIM CONNOR
Champion Chemical Co.

June and July hot and dry. Volume low, prices ditto. Methyl Parathion the goer, others slower, crop is short, collections poor.

MELVIN CLARK
Frontier Chemical Co.
Wichita, Kans.

Miticides Brighten Picture In Florida

RAY H. COONEY
Vice President
Flag Sulphur & Chemical Co.
Tampa, Fla.

This past season in Florida was a highly competitive one for most pesticide formulators and distributors. In Florida we divide agriculture into two distinct categories — citrus and vegetables. There was more competition on pesticides for citrus this past season than we have had for five years. The most prominent material was Zineb (Zinc Ethylene Bis-dithiocarbamate), which over the past few years has largely replaced the old stand-by—Dusting and Wettable Sulphur—for the control of citrus rust mite. The influx of foreign material, coupled with the efforts of domestic producers to expand their share of the market, resulted in a severe competitive and extremely unstable Zineb market.

However, all was not dark, as there were a number of the newer Miticides which afforded a stabilizing effect on the overall pesticide picture. These included Geigy's Chlorobenzilate, Hercules' Del-Nav, Stauffer's Trithion, Niagara's Tedion, and Rohm & Haas' Kelthane, all of which proved to be excellent miticides for the control of rust mite and citrus purple mite, and whose prices did for the most part remain stable.

Niagara (*From Page 29*)

becoming somewhat more mature in forecasting requirements and in exercising inventory controls. A few minor shortages of some toxicants, such as BHC and methyl parathion, did appear for short periods of time, but were not the cause of any undue hardship.

Demand for herbicides was good, paralleling the abundance of moisture east of the Rocky Mountains. There has been a modest increase in total sales volume of pesticides. Niagara products that sold unusually well in 1960 were Tedion®, Thiodan®, ethion, and Pyrenone® concentrates.

Planters Chemical Corp., Norfolk, Va.
by George Simches, Vice President

Generally speaking, in the area which we serve, sales volume held up very well during April, May and June. In July sales dropped sharply due mainly to a lack of insect infestations on the most important crops, tobacco, cotton and peanuts. The price pattern on competitive items showed no change from the critical picture of the past few years. If anything, prices deteriorated further this season.

The "position products," the technical forms of which are manufactured exclusively by one company, are attracting increasing attention. The dealer, or middle man, is understandably interested in promoting products which are not only effective and economical to the farmer, but which also return a fair profit to the seller.

Another noticeable trend has been that the farmer is becoming more aware of the matter of permissible residues on food crops. This was evidenced by a sharp increase this season in the sale of pesticides that can be used on food crops closer to harvest time. The policy seems to be to use the safe pesticide, even though it may be a little more expensive.

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- 92 to 95% will pass a 325 mesh screen
- Wt.—32#/cu. ft.
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- Chemically inert
- Non-alkaline

Dusts compounded with Glendon's Insecticide Grade Pyrophyllite will not absorb moisture, nor will the carrier separate from the active ingredients during storage. It holds well on plant leaves, even during rain, and when dusted from the air, settles rapidly, minimizing drift.

GLENDON DIVISION
CAROLINA PYROPHYLLITE COMPANY
P. O. Box 2414 GREENSBORO, N. C.

Sales To Trade Are Excellent

L. G. GEMMELL
Sales Director
Geigy Agricultural Chemicals
Ardsley, N. Y.

Sales of the agricultural chemicals which Geigy offers to the trade have been excellent. Volume on all of our products is up substantially over last year and the net return is interesting.

The movement of both insecticides and herbicides continues strong and we look for this year to surpass all of our previous sales records. The unseasonable weather delayed planting in some areas this spring, and temporarily slowed down movement, but this was more than picked up as the season progressed.

Consumer acceptance of the products we offer to the trade is well illustrated by the increasing sales volume which in part, reflects consumer knowledge that, in today's agricultural economy, the use of agricultural chemicals is of paramount importance in increased per acre income.

Consumers of agricultural chemicals seem to have taken in stride any unfortunate publicity which the industry received earlier this year.

Ammonia Unit Sold

The General Services Administration last month accepted a bid of $2.6 million by the Smith-Douglass Co., Norfolk, Va., for the ammonia plant in San Jacinto, Tex.

Smith-Douglass was the sole bidder for the plant at a competitive bid sale held Aug. 1 for the entire San Jacinto Ordnance Depot. The plant, built during World War II, played a major role in meeting ammonia needs during the war and postwar periods. It is capable of producing about 110 tons of ammonia a day.

DEALER SURVEY

(*From Page* 39)

crop insecticide use is quite different. Eighty-three farmers, or 26 percent of all the farmers in the sample, had used crop insecticides sometime during the years 1955-57. Thirty-one percent of this group used crop insecticides in all of the three years, 22 percent used them for the first time in 1957, but 47 percent had used insecticides in 1955 or 1956, but did not use them in 1957. In the case of the grass killers, only 5 percent had used them anytime during 1955-57, and 86 percent of these farmers used them for the first time in 1957.

It may be noted that specific weather, insect or other conditions, such as satisfactory brush kill in one or two years, may affect the continuity of use of some of the chemicals included in table 1.

Agricultural Chemical Expenditures

The average per farmer expenditure for agricultural chemicals for *all* farmers in 1957 was $47.02. The average expenditure for those farmers *using some* agricultural chemicals was $53.47. Forty-one percent spent less than $30. Eleven percent spent over $100. Thus in terms of total farm inputs it is apparent that purchases of agricultural expenditures represent a relatively small outlay. Table 2 indicates expenditures by category of chemicals.

Table 2. Expenditure Patterns By Categories of Agricultural Chemicals

Category of Chemicals	Percent Using Category	Percent Each Category Is Of Total Expenditures
Weed killers	87	47
Crop insecticides	30	24
Soil insecticides	14	22
Brush killers	19	4
Grain fumigants	3	2
Grass killers	3	1
		100

Answers Behind Use Patterns

As stated in the introduction there are probably many reasons why farmers are not using agricultural chemicals at a more nearly optimum level. Many of these factors may be beyond the perception or control of the farmer. The data reported here deal with only some of the aspects of the problem specifically from the farmer's point of view.

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PLANT #2—Ark.: "...plant is...under operation...very best choice we could make...appreciate your continued assistance...will highly recommend you..."

PLANT #3—Okla.: "...as construction nears completion we are pleased that we decided to order our liquid fertilizer plant from J. C. Carlile Corp."

WRITE for copies of the letters from which the above quotations are taken. A typical Carlile Process liquid fertilizer plant utilizes wet process phosphoric acid to produce 15 to 35 tons/hr. of 8-24-0 liquid fertilizer, designed to your market and built on a performance-bond turnkey basis. Ask for complete literature and quotation.

Write for information on:

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- AMMONIUM PHOSPHATE (liquid)
- AMMONIUM PHOSPHATE (dry)
- AMMONIUM SULPHATE
- COMPLETE COMPLEX FERTILIZER
- LIQUID COMPLETE FERTILIZER (Wet Process Acid, or Normal and Super Phosphoric Acid)
- SINGLE SUPER PHOSPHATE
- SULPHURIC ACID
- TRIPLE SUPER PHOSPHATE
- WET PROCESS PHOSPHORIC ACID

j. c. Carlile corp. ENGINEERS

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How important is the use of agricultural chemicals to the farmer's income?

The farmers were asked, "How important do you think it is to your farm income that you use agricultural chemicals in your farming operation?" Eight percent were using no agricultural chemicals. It seems safe to assume that this eight percent think farm chemicals are relatively of little or no importance to their income. Those using some agricultural chemicals, 92 percent, gave the following answers.

Table 3. "How important do you think it is to your farm income that you use agricultural chemicals in your farming operation?"

Very important	49 percent
Of some importance	42 percent
Little or no importance	5 percent
Unimportant	2 percent
Don't know	2 percent

(*To Be Concluded*)

NED A. BOWER has been appointed sales representative for the California Spray-Chemical Corp.

EDITORIALS

(*Continued from Page* 27)

one of the gravest problems faced by a large portion of the world's population. While the United States is faced with the problem of how to dispose of food surpluses, many less-developed nations are unable to adequately feed their people. It goes without saying, of course, that well-fed people are less inclined to create unrest and add to world tensions than are poorly-fed people.★★

DOW PROGRAM

(*From Page* 41)

order 50 2-oz. samples of the product packed in a display case. The buyer was invited to take one of the samples and test it out in advance of buying. Return cards queried the user on his experience with the product. A series of four advertisements, paid for by Dow, were run in a newspaper of the dealer's choice, at least half of them promoting the sample offer.

The program was expanded this season to include other items in the Dow line. The price of dealer participation in the cooperative advertising program was upped this year to 15 units. The dealer who buys as many as 30 units gets six local advertisements which he may select from 30 different pieces of copy offered to him. Copy in these advertisements may be adapted by the dealer to meet specific local conditions, and the advertising can be run when he feels the situation is most timely. Mr. Bryant observes that "many dealers now extend the impact of Dow-paid ads with local newspaper advertising of their own."

The parent Dow organization has for years adhered to the policy of plowing a major share of corporate profits back into product research, new plant construction and market development. No exception is made with the ag division, where, they report, a sum equal to approximately 6% of the sales total is earmarked annually for research and product development. This research results in a growing list of new and improved products for the agricultural field. J. W. Britton, manager of the Dow Agricultural Chemicals Division, told *Sales Management* that "about half of our 1959 volume came from products new or improved in the last five years. But even when we come up with something that is needed," he added, "we must make sure that farmers will be willing to pay for it."

As an illustration, he referred to a market study currently being made in Texas on Dow's Korlan Smear for screwworm control. The Dow product, according to Mr. Britton, controls screwworm with only a single treatment, but is more expensive than competitive products which may require multi-

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ple treatments. The reactions of stockmen are being studied this season to determine whether they will be willing on a continuing basis to pay the higher price for what Dow believes is a superior product.

Dow breaks its Agricultural Chemicals Division down into five marketing units, each headed by a manager. First is the resale or retail division, which employs 60 field salesmen operating out of 18 regional Dow offices. The other four marketing units include one which works with railroads in the use of herbicides along rights-of-way; another which promotes industrial herbicides; one which serves the lawn-and-garden market; and the fifth charged with responsibility for sale of additives to feed manufacturers.

Present target for the Dow Ag Chem Division is a sales total of $64,000,000 for 1961.★★

SAFETY SCHOOL

(*From Page* 45

accident happened so that precautions may be taken so that the accident does not happen again, Mr. Creel said. There is little to be gained, he pointed out, from an investigation to find out who was responsible. Each investigation should be made as soon after the accident as possible, he declared, and a definite accident investigation procedure should be followed.

The most effective method of preventing accidents, Mr. Creel said, is a safety plan that has the belief and support of top management. Among the components of a successful plan, cited by Mr. Creel, are:

1. Safety committee
2. Plant inspection
3. Accident investigation
4. First Aid
5. Good housekeeping
6. Safety training.

Twenty-five representatives of fertilizer manufacturers in the Northeast attended the school which was the first school in the final series of regional supervisory safety training schools in a three-year program sponsored jointly by the National Plant Food Institute and the Fertilizer Section of the National Safety Council. This is the final year for the schools which are devoted to the improvement of safety in the fertilizer industry. Directors of the Northeast school were Mr. Creel and Stratton McCargo, Grange League Federation. Harlan Perrins, N. Y. State School of Industrial & Labor Relations, Cornell University, was chief instructor.

Two subsequent schools already have been held—the Midwest school in Chicago, Aug. 16 and 17, and the Southeastern school in Wilmington, N. C., Aug. 26 and 27—and the final two schools are scheduled for October and November. The Far West school will be held in the Hacienda Motel, Fresno, Calif., Oct. 26 and 27, under the direction of Austin Cline, Shell Chemical Corp. The Southwest school is scheduled for Nov. 8 and 9 in the Jung Hotel, New Orleans. Harold Hatly, Smith-Douglass Co. will be the director.★

FERTILIZER VIEWS

(*From Page* 51)

ists as indispensable to man and animal.

Soil scientists have learned to solve some of the baffling problems of properly feeding a crop. For example, it is a common practice to lime a soil to reduce acidity; but, an excess of lime will interfere with the absorption of magnesium, and an excess of potassium reduces the uptake of calcium and magnesium. The mineral composition of cereal grains is only slightly affected by fertilization; but that of green vegetables, root crops and green herbage can be greatly affected. These differences are small however, compared with differences among different plants: for example, the ratio of potassium to calcium plus magnesium is 1.5 to

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Many fertilizer people for whom we produce bulk materials have found very definite advantages in incorporating, with their formula, the Davies' trace element product

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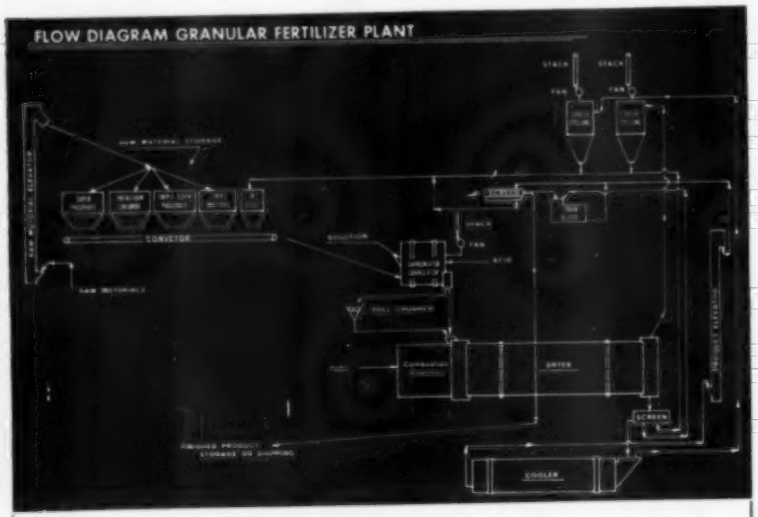
to 5 in beans and peas and as high as 10 in potato tubers (assuming the sum of the calcium and magnesium to be 1.)

These relationships are mentioned principally to indicate that the subject of plant feeding is a complex of many factors, as is that of nourishing man and animal. In popular discussions, the tendency is to simplify the problem. This is a necessary condition considering the purpose; only the most general outline of the multiple ionic relationships can be given to laymen. Critics of the use of chemical fertilizers in food crop production generally ignore the advanced state of modern nutritional science in relation to current fertilization practices, and since they usually write and talk glibly on generalities with sly appeals to organized prejudices, they succeed in popularizing their point of view.

Research in agricultural chemistry, plant physiology and nutrition has nevertheless put modern mineral fertilization on a sound basis. Future generations will be spared the spectre of starvation so long as the world fertilizer industry is permitted to serve agriculture and mankind.★★



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PHYTOPATH MEETING

(*From Page* 43)

die. Dr. Cameron said that the disease has remained unidentified until now, primarily because of other local conditions resulting in unthrifty pear orchards. He cited poor irrigation and fertilizer practices and unhealthy rootstock-scion reactions as other major causes of decline.

Disease Control in Legumes

A new virus disease of many legume crops has been identified by two Washington State University pathologists, C. B. Skotland and D. W. Burke, who reported that the virus attacks at least some varieties of several legumes, including dry beans, green beans, lima beans, tepary beans, cowpeas and chickpeas. Infection tests, they report, have shown several legume varieties to be immune to the new virus. These include varieties of green beans, peas, cowpeas, soybeans, alfalfa, sweet clover, crimson clover, red clover, ladino clover, velvet beans and broadbeans.

According to William B. Allington, E. L. Moorhead, and R. Staples, Nebraska University, soybeans in Nebraska are protected from a destructive virus that is widespread in the state, because the insect that carries the disease seems to have little taste for the crop. These researchers identified pea aphids as primary carriers of alfalfa mosaic, and demonstrated this pest's incompatibility with soybeans.

Barley seeds from Abysinnia hold the major hope of American

plant pathologists to conquer yellow dwarf virus disease, a new disease that threatens cereal grain production both in the U. S. and abroad. C. W. Schaller, a University of California scientist, has tested nearly 7,000 barley varieties from all over the world against this virus, and found only 28 Abysinnian varieties that were highly resistant. With this material, Dr. Schaller believes that American plant breeders now will be able to develop new barley varieties with the high yield and good qualities of present day varieties, plus resistance to yellow dwarf.

Liming Controls Tomato Disease

Gray mold, which in recent years has come to be a major disease of tomatoes grown on the sandy, acid soils of Florida, apparently can be controlled with soil-liming practices.

Robert E. Stall of the Florida Agricultural Experiment Station successfully reduced fruit rot from about 10 per cent to 1 per cent by the application of hydrated lime at the rate of 9,000 pounds per acre.

Because of the preliminary nature of his results, Dr. Stall is not yet ready to recommend liming as a disease control practice to growers. Nevertheless, his report establishes a close relationship between gray mold incidence and soil acidity.★★

BAGGING PROBLEMS

(*From Page* 48)

This program of studying customer bagging practices, and offering practices for improvement, is just one part of Union Bag's broad concept of customer service. Like many other forward looking companies selling the fertilizer field, they have adopted the idea that the best way to get and *hold* customers is to make the customer's problem their problem,—to try to show these customers, and potential customers, how to solve their production and distribution problems, how to manufacture and improve products at a lower cost, and, in short, how to sell more fertilizer at a higher rate of profit.

To achieve this purpose they:

1) hold clinics for sales and technical staffs
2) provide trouble shooting
3) offer complete package engineering and design service.★★

PRODUCTION ROUNDTABLE

(*From Page* 49)

where: t_a = time required for 5 grams of attapulgite to pass through screen

t_f = time required for 5 grams of formulation to pass through screen

d_a = light pack density of attapulgite

d_f = light pack density of formulation

Results:

Several types of commercial clays as well as two series of formulations were run. Data are shown in Table I.

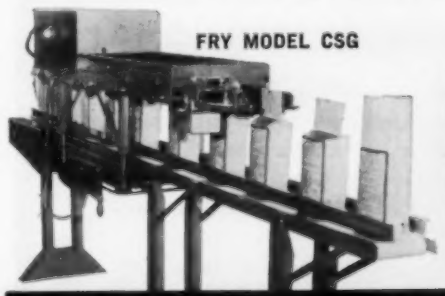
Discussion:

This method gives results which correlate well with all five of the basic premises stated above. It separates the good-flowing dusts from the poor ones and also shows the trend of loss of flowability with increased amounts of impregnated oily materials.

The test is one which is simple to run in only a few minutes. It removes the ambiguity of the flowability property and yields an index which may be used in the development of new formulations as well as in the control of production processes.★★

Acknowledgement:

The author wishes to express his appreciation to Mr. Leo Trademan for his helpful assistance.



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PEST ROUNDUP

(*From Page* 61)

sippi Delta, infestation counts remained low. Average infestation of inspected fields in Louisiana in late July was 13 per cent, while counts varied widely in Arkansas and ranged from 0-17 in Missouri. In Oklahoma, the overall average was approximately 10 per cent. In Texas, the weevil continued to be a serious threat in the southern, eastern, and central areas. Square counts in McLennan and Falls Counties, Texas, averaged 42 per cent punctured squares in treated fields and 67 per cent in untreated fields examined.

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Bollworms caused concern in several cotton-growing areas during July. By the latter part of the month, the insects had increased to a point where they were expected to become a threat in all cotton fields. In many areas of South Carolina, the rapidly increasing damage by bollworms was causing more concern than injury from any other cotton pest. Damage to squares and young bolls was general throughout the State, with the heaviest being in the lower Coastal Plains and Piedmont areas. The potential damage in the State appeared to be greater than for any previous year.

In middle and southern Georgia, bollworm egg counts during the latter part of the month showed an average of 53 per 100 terminals and the larval count 9 per 100 terminals. Although, earlier in July, there had been a decrease in bollworm infestations in Alabama, by the last of the month an increase was noted throughout the State. Bollworm moth flights were on the increase in Mississippi, but eggs and larvae were not showing a proportionate increase. The insect continued to be a serious threat in southeastern and central Texas and was building up to economic populations in a few isolated areas of southern Oklahoma. Infestations were increasing to damaging numbers in some fields of the Mesa, Arizona area. Populations in Tennessee, Louisiana, Arkansas, and Missouri were on the increase, but still relatively low.

The finding of the Mexican bean beetle in backyard gardens at Jerome, Jerome County, Idaho, during late July is of particular interest. As of July 29, the insect was found to be infesting 80 gardens, but no populations have been found in commercial or contract bean fields surrounding Jerome. This is the only know infestation of the insect in Idaho and, upon its discovery, immediate eradication efforts were undertaken. Infested plants within the city limits

were burned and all other plots treated with insecticides.

In 1954, the Mexican bean beetle was found in the Twin Falls, Idaho area, but the infestation was eradicated. The Jerome find this year is the first record of the insect in Idaho since 1954.★★

LISTENING POST

(*From Page* 63)

chlorosis. All control trees were severely affected.

According to Dickens and his associates, foliage applications have not produced satisfactory control of peach tree chlorosis in Colorado, where chelated iron compounds have been tested for several years. The pot-hole method of soil application formerly used, in which the material was concentrated in holes at equal distances from the tree, did achieve good control. However, lack of uniformity in foliage response suggested that a more even distribution of iron chleate in the feeder root zone might give better results. Preliminary comparisons in 1958 led to the long-band method of application used in the 1959 experiments.

Onion Smut Control

The oldest treament for control of onion smut (*Urocystis cepulae*), namely a 1% formaldehyde solution applied in the row with the seed, still is preferred by many New York muckland growers, according to A. G. Newhall and R. E. Wilkinson (4), of Cornell University. Two other liquid preparations, nabam (disodium ethylene bisdithiocarbamate,) and a mixture of 59% formaldehyde and 26% urea, applied in the same manner and at the same concentration as formaldehyde, recently have been found to give as good control. In some ways, use of nabam would be most advantageous. According to Newhall and Wilkinson, nabam is being recommended for trial by growers. Both Nabam and the formaldehyde-urea mixture seem to be compatible with the insecticides used for maggot control.

Olpidium on Lettuce

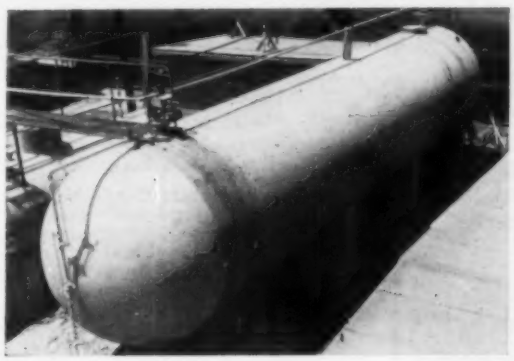
Saul Rich (6), of the Connecticut Agricultural Experiment Station, writes that strong evidence has been reported of an association between big vein, an important disease of lettuce, and infection of lettuce roots by a species of *Olpidium*, a soil-borne organism; and, further, that if such a connection actually does exist, treatment to protect lettuce plants against root infection by *Olpidium* should also protect them from big vein.

In experiments to determine the effectiveness of soil treatment for control of *Olpidium*, pentachloronitrobenzene 75% (PCNB) at 50 ppm, and zinc sulfate ($ZnSO_4 \cdot 7H_2O$) at 50 and 200 ppm of actual zinc, were mixed with dry sand. All 10 plants grown in PCNB-treated sand were free from *Olpidium* infection; whereas, in both the zinc treatments and in the untreated check, 8 out of 10 plants were infected. Zinc at 200 ppm produced appreciable stunting. No injury resulted from other treatments. No big-vein symptoms appeared in any treatments, probably because greenhouse temperatures were too high, according to Rich.

Zinc sulfate was included in the tests because it had shown some chemotherapeutic activity against big vein in earlier experiments and because zinc, as zinc frit, had been found to control organisms related to *Olpidium*, such as *Plasmodiophora brassicae*, the cause of cabbage club root. As possible explanation for its failure to control *Olpidium* in these tests, Rich suggested that, for zinc to be effective, it should be applied to lettuce plants for a period prior to their being set out in infested soil.

Gibberellic Seed Treatment

Roy D. Wilcoxson and Theodore W. Sudia (7), of the University of Minnesota, report the re-



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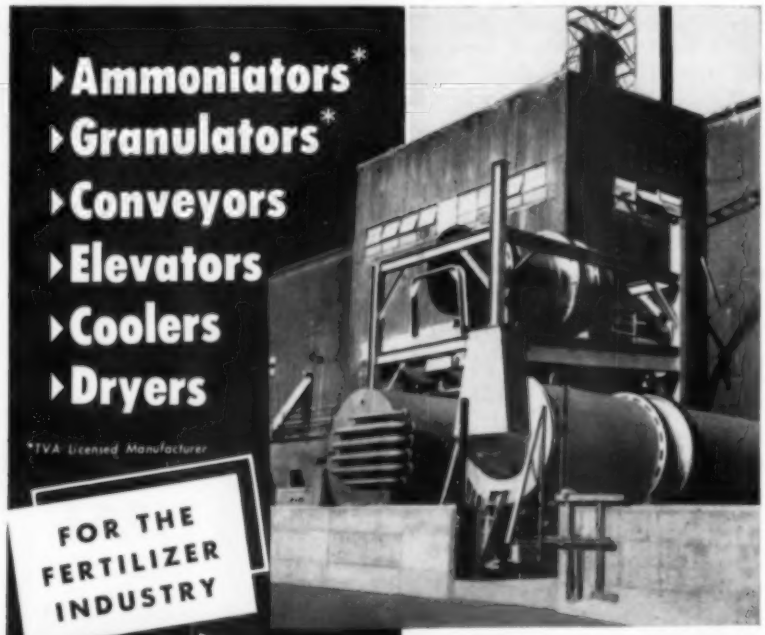
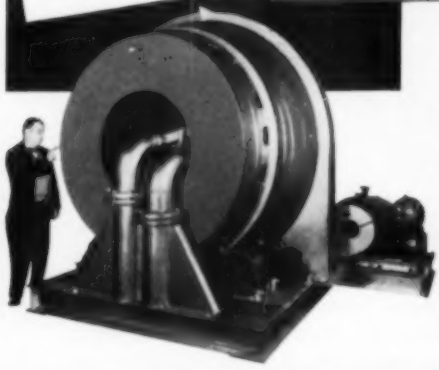
sults of a greenhouse and field study of the effects of seed treatment with gibberellic acid on establishment of corn seedlings and development of seedling blight.

For the greenhouse experiment, corn seeds were soaked in different strengths of gibberellic acid solution or in distilled water. Comparisons between seedlings from treated and untreated seeds, 3 ½ weeks after planting, showed differences that were consistent in trend, although mostly not statistically significant. Leaves and roots were longer on plants from treated seed. Treatment resulted in somewhat more root rot. Increased incidence of seedling blight was indicated by reduced emergence and survival of seedlings from treated seed. Length of time the seeds were soaked in gibberellic acid did not affect results.

For the field experiment, seeds were soaked in a 100-ppm solution of gibberellic acid, or in distilled water, for 12 hours. Two weeks after planting, plants from treated seed were chlorotic and varied greatly in height, from ½ inch to 9 inches. The light brown color of the roots and the scarcity of adventitious roots indicated severe seedling blight. In contrast, plants from untreated seed were green and did not vary much in height. The roots were white with abundant adventitious roots. At that time it seemed likely that plants from treated seed would be a total loss, but with the advent of hot dry weather, early in June, the plants recovered. At tasseling time, and afterward, effects were not evident. Yield was somewhat smaller from treated than from untreated seed.

Wilcoxson and Sudia concluded that gibberellic acid treatment of corn seed may increase seedling blight; also that the effects of the chemical on disease incidence should be thoroughly investigated before its use in commercial corn growing is recommended.★★





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MOLYBDENUM

(*From Page 32*)

spots form between the leaf veins. Gum and cells form on the lower leaf surfaces. Badly affected leaves eventually drop off. Extremely diseased trees may become almost completely defoliated during the winter. Production of such trees is greatly reduced and the fruit often bears spots resembling sunburn. The Moly-Gro Foliar Spray is reported to prevent yellow spot effectively and economically.

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Soils most likely to respond to molybdenum treatment are those that have been highly leached, such as the coastal sands and hill country soils, heavily cropped soils, and the alkaline soils in areas of heavy rainfall. Thus, almost every section of the United States has shown response to molybdenum treatment except the Southwest where, in some cases, there is an excess of molybdenum in some soils.

This year, more than 60 million acres of legumes were planted in the United States. Their breakdown is roughly as follows:

Acres planted	Crop
35 million	small seeded perennials such as alfalfa, clover, and vetch
25 million	soybeans
1½ million	peanuts
1 million	beans and peas

Dry seed peas are grown generally in the Northwest; peanuts in the Southeast; alfalfa, nationally with good crops in states such as New York, New Jersey, and Wisconsin; soybeans, in states bor-

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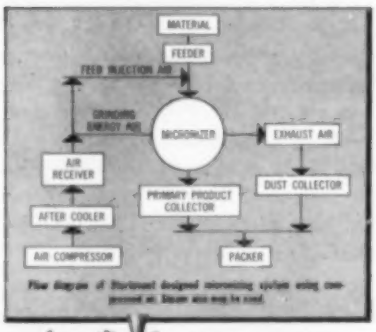

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dering the Mississippi River. In all of these areas, molybdenum has been used successfully under actual farming conditions, providing increased yields at low cost. As current research and field testing is completed, new crop applications will be developed under local soil conditions.

It is estimated that United States farmers boosted legume output by some 20 million pounds in 1960 through molybdenum treatment. This meant roughly a $700,000 increase in farm income. In 1961, even greater results are likely with molybdenum playing an increasingly important role.★★

ORCHARD TOURS

(*From Page* 37)

This past spring was particularly favorable for mildew development, and some materials which had looked promising in earlier years in control of apple powdery mildew did not quite come up to expectations, in his experiments, according to Dr. Sprague.

On the other hand, good control was obtained with Karathane, used at the rate of ¾ pound of wettable powder or 6 ounces liquid, when five sprays were applied. Comparable control was obtained with Niagara 5943 used at the rate of ½ pound.

Some later season sprays (applied May 9, 19 and June 1) of Phyto-Pabst (AL 307) gave good control without apparent injury. This antibiotic was not tested in early season sprays, but in the greenhouse, it does better against mildew on maturing leaves than it does against active mildew on young leaves.

Oils (Volck Supreme or Penco Superior Spray Oil) at 1 gallon had no appreciable effect on mildew, while Karathane plus Penco caused some leaf injury with only transient effect on the fungus.

Captan apparently had little effect on mildew, and although Cyprex did slightly better, "against the huge development of mildew in early May, it was much less promising than it had been under moderate mildew development," Dr. Sprague commented.

Some two dozen other materials varied in their effectiveness, but most of them were either too weak or caused injury. A copper hydroxide complex, DY-Q-Plex-1, has just been received and needs further trials, he reported.

Dr. Archie Van Doren, superintendent of the tree fruit experiment station, reported results with Monsanto's Santoquin, now called Stop-Scald, which has just been cleared for use in control of common storage scald on apples. (The tolerance established by FDA is 3 ppm).

"Stop-Scald can be used as a pre-harvest spray at 3 pints per 100 gallons, which gives 2,700 ppm, within two days of harvest, or as a post-harvest treatment at 2 pints per 100 gallons of water, which is 1,800 ppm," Dr. Van Doren reported.

"In studies last year with this material, I found that it gave excellent control of storage scald on Red Delicious, Standard Delicious and Winesaps." Dr. Van Doren used 2 pints per 100 of the material on Red Delicious and controlled scald completely. However, scald was harder to control on Standard Delicious, and 3 pints were necessary to obtain 100% control.

Dipping is a good method of application, but the strength of the emulsion must be maintained, and a total change of the liquid once or twice a day is recommended.

"This method may cost only 1¢ to 2¢ per bushel," Dr. Van Doren estimated, in comparison with 6¢ to 10¢ a bushel when it is applied as a spray. However, not many packing houses will want to invest in dipping tanks and fruit elevators until more is known about the material.

Dr. Van Doren suggested using a spray as the apples pass over the rollers on the way to the sorting table. He asked for reports from growers who make experi-

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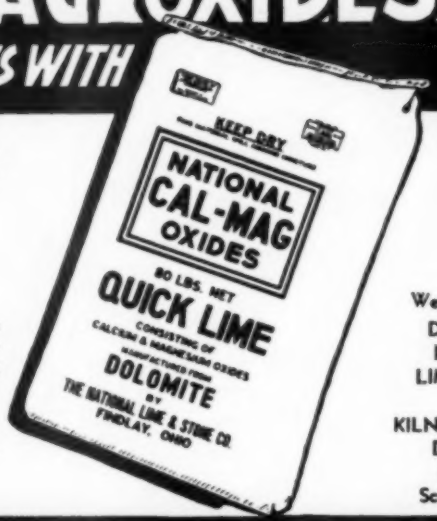

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ments with Stop-Scald, suggesting that a few bins or boxes could be sprayed using the material at the rate of 2 pints per 100 gallons of water.

Comparable lots should be stored with the treated fruit, then the samples held at room temperature for a week following removal from storage. Fruit which has been dipped, drained and dried will be under the 3 ppm if handlers follow directions on the package, according to Dr. Van Doren, who added that he had noticed no itching resulting from putting his hands in the emulsion many times, except when he was sweating.★★

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(*From Page* 55)

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1960 PESTICIDE SALES PICTURE *(Continued)*

United Heckathorn (*From Page 28*)

new outbreaks of spotted alfalfa aphids. Diazinon found use on grapes, tomatoes and other crops, and Dylox was used mostly for armyworm outbreaks on alfalfa and tomatoes. Guthion was being widely used and accepted on apples, pears and peaches, where DDT resistance has become widespread.

Interest in Aramite was revived this season, with a new eight pound emulsive product giving outstanding control of mites on cotton and seed alfalfa by airplane. Kelthane was the most widely accepted miticide dust on most crops. Dibrom gave excellent results for leafhoppers and aphids. The new virus B.T. looks promising for controlling the larger instar worms of cabbage looper on lettuce and cole crops. Endrin enjoyed late season sales on cotton, due to new application techniques which lessen drift hazard. Sevin gave excellent control of corn earworm on tomatoes and sweet corn and on grapes for leafhoppers.

In Hawaii, insecticide sales were generally lower. Heptachlor and Malathion were used on pineapple, while Nemagon soil fumigant looks promising for post plant treatment. The release of Simazine Herbicide for use on sugar cane greatly increased sales of this product.

In general, prices of ag chemicals in the West were about normal. The grower, however, paid a higher cost per acre for his pest control due to the switch to more costly phosphate and carbamate insecticides.

Atlas (*From Page 28*)

more potential profits due to pesticide usage. More demonstrations sponsored by pesticide manufacturers can help to increase future consumption.

As to specific chemicals, use of Methyl Parathion, Toxaphene and DDT increased substantially. BHC and Endrin showed a decrease. Most products were used in higher concentration and in combination. In fact, too many combinations of chemicals were sold. A program of strong specific standard recommendations as to analysis is greatly needed. This will avoid consumer confusion and also minimize the formulator's problem.

Our industry is still plagued with "consignment" or "guaranteed sale" policies. Prices have been quite stable, with the farmer getting a good buy. Some companies practice "dumping" at the inappropriate time and cause troublesome spots. The well-managed companies should have a successful and profitable season.

Calspray (*From Page 29*)

ducers must now offer, and the increased risks they have been forced to assume.

This past season of operating under the Miller Bill has demonstrated just how difficult it now is to make positive recommendations to growers on what pesticides to use, and how difficult it is to regulate such a complex industry as this.

Shell (*From Page 29*)

Adverse spring weather conditions in the Southeast shortened the marketing season for soil fumigants; however, increased sales of nematocides in the West offset this loss.

So far as Shell products are concerned, Phosdrin® insecticide has been widely used this season on vegetables and forage crops, where difficult insect control problems existed and where problems occurred close to harvest. New products such as Vapona* insecticide and Aqualin® herbicide were also well received.

Despite the late spring weather, excessive rains in some parts of the country, and droughts in several southern states, the 1960 pesticide sales season, unique as it was, will compare favorably with 1959 when the figures are added up at the end of the year.

W. R. Peele (*From Page 30*)

So far as prices are concerned, we have heard less grumbling from dealers and growers this year, although not many increases in price were put into effect. Farm supply dealers and growers alike are always in a better frame of mind when the growing season is good and crops look as if everyone will get paid. Barring late season bad weather, farmers in the area in which we operate should come out the best they have in several years.

Chemagro (*From Page 30*)

What has been the agricultural chemical producers' loss should be a helpful gain for the farmer and help his financial position for the coming year. Inventory levels in the field have generally reached a healthier state, for the reduced business came about in an orderly fashion and there was sufficient time for the downward adjustment of inventories.

* * * * *

JAMES K. MERWIN has been appointed senior market analyst, market research department, by Allied Chemical's National Aniline Division. His headquarters are in New York.

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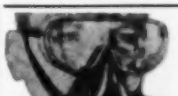

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WILLIAM R. SIMMONS has been named salesman for the Kentucky-Indiana territory by American Mineral Spirits Co., Chicago. His headquarters are in Louisville.

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HOMER O. WOODRUFF has been appointed general manager of the Domestic Producing Department of Texaco Inc., New York. He joined Texaco in 1933.

AC

J. R. BOLING has been named chief chemist at the American Agricultural Chemical Co.'s laboratory at Danville, Ill.

BOOK REVIEW

Handbook of Pest Control. By Arnold Mallis. 3rd Edition. 1132 pages. Generously illustrated. Published by MacNair-Dorland Co. $12.50.

This book should more appropriately carry a less inclusive title, as it is confined to consideration of *household* pest control, and does not attempt to cover the subject of agricultural pests and their control. Within its own field of household pests, and control problems involving them, however, the Mallis book is complete and exhaustive, devoting separate chapters to ants, spiders, flies, gnats and mosquitoes, mites, ticks, beetles, moths, bedbugs, stored product pests, termites, crickets, etc.

It is designed specifically to be helpful to the pest control operators, giving assistance on identification, and offering practical suggestions on control for each pest covered. The subject is treated often in a light and homorous vein, rather than in a detached, scientific manner, and numerous homely and amusing anecdotes from the author's experience are included.

A separate chapter covers pesticides, the common preparations used by the PCO being briefly reviewed. Household fumigation is treated in another chapter which includes coverage of the fumigants generally employed to treat: railroads cars, houses, vessels, etc.

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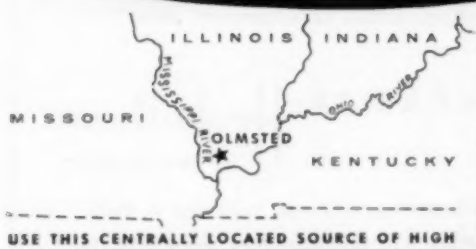

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This high grade clay is available in a variety of textures to meet specific needs.

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212 York Street, Cassopolis, Michigan
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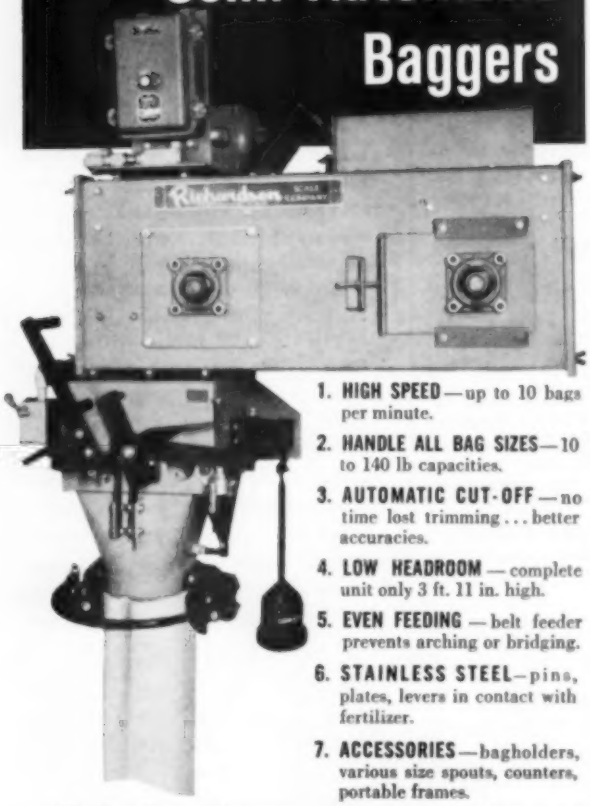
7 Reasons Fertilizer Plants Buy Richardson GA-17 Semi-Automatic Baggers



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MATERIALS HANDLING BY WEIGHT SINCE 1902

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In 7 parts per million tolerance as allowed on most agricultural crops. Can now be used on vegetables, tomatoes and cotton for loopers, boll-worms and fruit worms.

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For agricultural and structural pest control. Roaches, Fleas, Drywood Termites.

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TALE ENDS

THIS is the season of the year when a new series of meetings gets under way. The National Agricultural Chemicals Assn. will meet out on the coast next month, their meeting to be preceded by that of the Western Agricultural Chemicals Assn. The American Phytopathological Society has just met in Wisconsin, and the orchard tours sponsored by the Washington Horticultural Association were completed last month. Later on in the fall will come several of the important meetings of the entomological societies and many other associations.

One of the purposes of these meetings is to check on what the results have been this season with some of the multitude of new products that continue to come from the research laboratories of basic producers of pesticides. This year another group of new materials are reported to show promise. A project for one of our early issues will be to list the new products, and summarize briefly the results of preliminary test work. Sometimes we wonder what is the point of the pesticide industry developing all these hot new products when, in general, they do so little to build markets for the excellent materials they developed last year, and the year before.

AC

Opening of a Phosphate Museum in Peace Park, Polk County, Florida, is scheduled for October, 1960. This new Florida tourist attraction, supported and financed in part by Florida phosphate producers, will contain one of the finest collections of pleistocene fossils in the nation. It will also house a series of educational exhibits showing what phosphate is, how the phosphate deposits were laid down millions of years ago, how phosphate is recovered from the deposits, and how various phosphate by-products are used in agriculture and industry. It is fitting that the museum will be located on the bank of the river in which Florida phosphate was first discovered. One section of the museum will depict the phosphate industry in a miniature display of actual workings from the time the rock is taken from the earth up to its incorporation in the finished product. Another panel will display over 200 products in which phosphates are used, and emphasize the important contribution which phosphate makes to life.

AC

One of our contemporaries in this ag chemical trade paper business has recently been on a sustained marketing kick. Under the heady influence of reading their own stuff too steadily and perhaps taking themselves too seriously, they now seem to believe they discovered the whole idea of marketing, and all others who mention the subject are necessarily imitators. For their edification, it has long been generally recognized that marketing is one of the important factors involved in operating a business.

But it is not the be-all-and-end-all, nor should it be the sole topic covered by any trade publication charged with the responsibility of offering a balanced editorial diet to a wide cross section of readers in any industry. There are still a lot of purchasing agents around, and plant superintendents, engineers, controllers and just plain vice-presidents.

We will continue, as we have in the past, to try to make *Agricultural Chemicals* a well rounded publication editorially,—covering sales and marketing, but not neglecting production, administration, management, purchasing, etc. It's our feeling that a serviceable stool needs at least three legs, just as a good fertilizer needs N, P and K. Balancing on a single support provides a shaky platform at best.

AC

Los Angeles, which ten years ago put in a $7 million dollar fertilizer plant as part of a new sewage disposal system, has now halted fertilizer production and will henceforth dump all sludge into the ocean. Reports from Los Angeles indicate that the city was receiving $4 a ton for the output of the plant, as against estimated cost of production of $26. Production facilities, it is reported, will remain in mothballs. **More on this decision on page 77 of this issue.**

A TYPICAL AGRICULTURAL CHEMICAL SUBSCRIBER TELLS

Why He Reads Agricultural Chemicals

FRANK M. FEFFER
Arizona Fertilizer & Chem. Co.
Phoenix, Ariz.

I always enjoy reading AGRICULTURAL CHEMICALS. *In fact, it probably is more closely read by our personnel than any other publication coming in. It not only is factual and timely, but it seems to me that its editors have the happy faculty of selecting those articles which are of particular interest to the industry and, particularly, to a company such as ours.*

I was most favorably impressed with its first issue and felt that it was filling a real need in our industry. It has continued to do a bang-up job ever since.

Arizona Fertilizer and Chemical Co., Phoenix, was the state's first fertilizer business when founded 30 years ago. Its equipment today includes four large plants, in Phoenix, Willcox, Yuma, and Toltec, plus a wholly owned subsidiary in Phoenix and an impressive array of modern machinery, vehicles, office buildings, and laboratories. Among the "Arizona firsts" credited to the company are: labelling contents of bags of fertilizer; balanced fertilizers; college degrees for all field men; radio service to field men; laboratory service; and the addition of trace elements in fertilizer. Frank Feffer joined the company in 1935, a year after it had been purchased by his father. Now president and general manager, Mr. Feffer has been a prime mover in the company's progress.

— Leader in the Field —

AGRICULTURAL CHEMICALS

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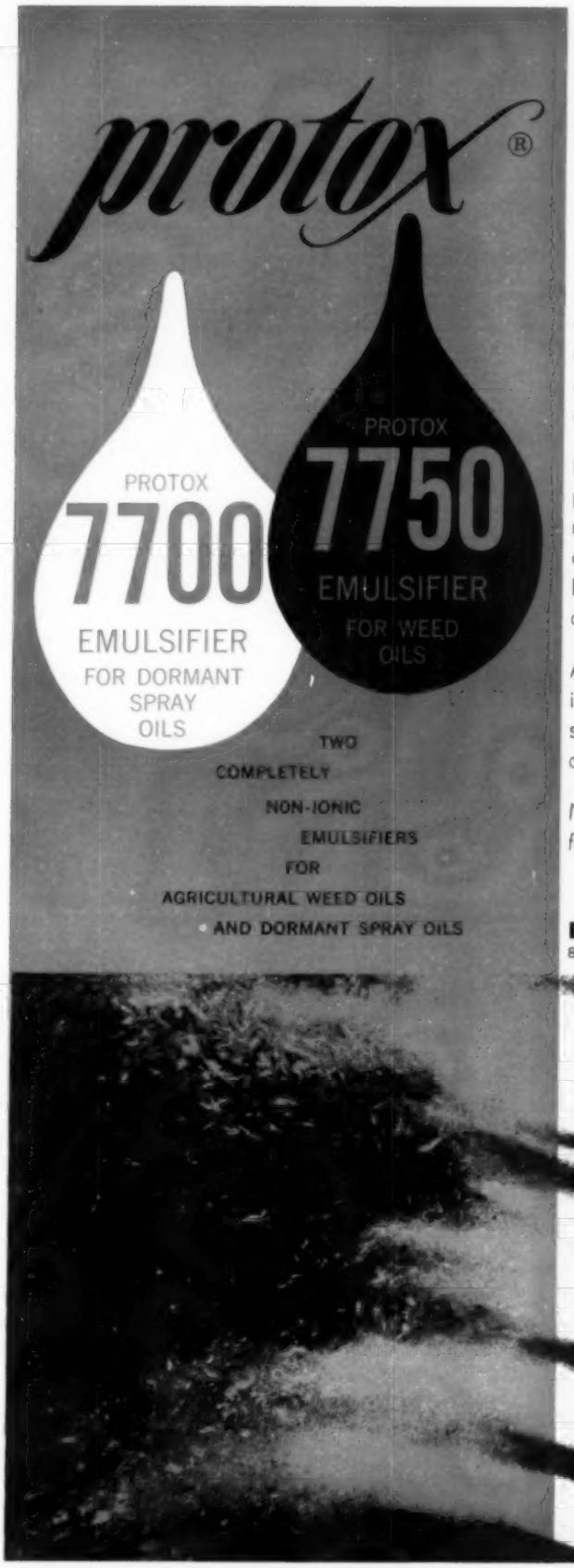

Protox 7700—an emulsifier for use with dormant spray oils to combat infestation in citrus and other fruit trees.

Protox 7750—especially formulated for use with weed oil sprays to control regular and aquatic weeds in irrigation ditches and around the base of trees.

These completely non-ionic emulsifiers are manufactured in our own oxide adduct plant, the only one of its kind in the west. This gives us complete flexibility for the preparation of various emulsifiers with the correct spreading, wetting and sticking properties.

Protox 7700 and 7750 are readily pumped or poured. They are free from metallic ions, and contain no ash or water. Emulsions with controlled break can be readily made with either hard or soft water. Being non-ionic, they are compatible with other agricultural chemicals used in spray oil formulations.

As little as one-half to two percent Protox 7750 is used in formulations for weed oils. Ask us about specific formulations for your particular weed oils and dormant spray oils.

Now available . . . new technical bulletin on suggested formulations with Protox Emulsifiers. Write today.

PROCESS CHEMICALS COMPANY
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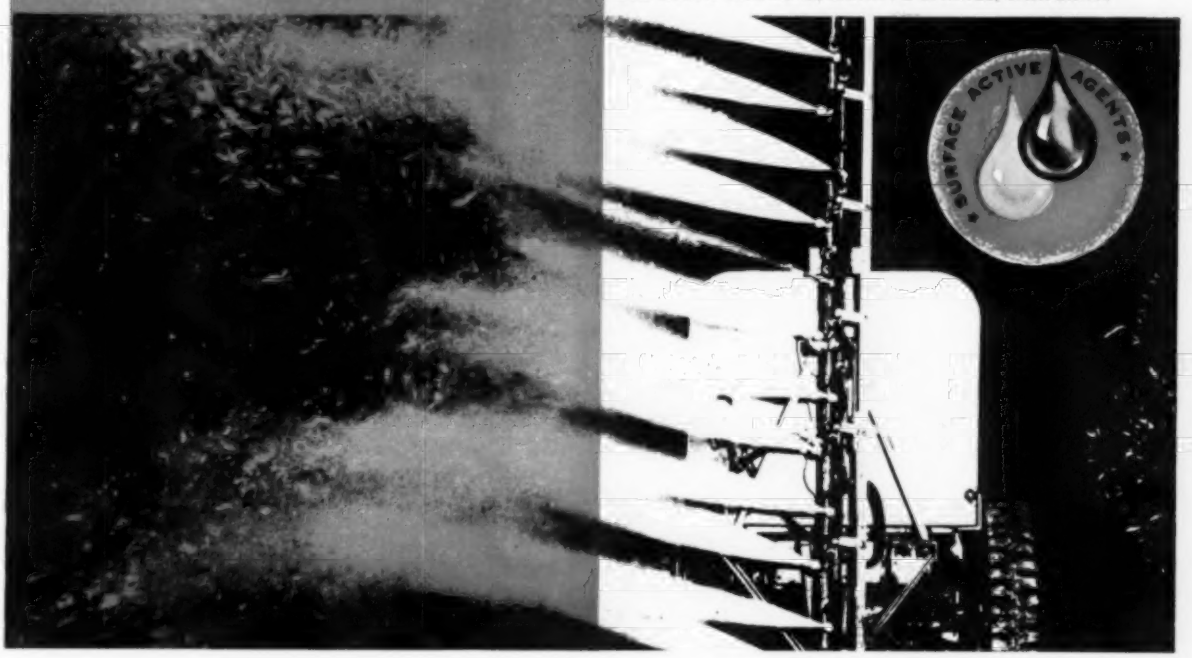

FAIRFIELD CHEMICALS

Fairfield Facts

CHEMICAL EDITION ★ ★ ★

SAFETY, SYNERGISM AND SALES APPEAL
THAT'S BUTOXIDE!!

The most extensive laboratory and field tests ever conducted on an insecticide by any company proved piperonyl butoxide's unique low order of toxicity which resulted in tolerances and official clearances not yet given to any other insecticide and its use with pyrethrins. Rats were fed piperonyl butoxide with all the food that they consumed from time of weaning through the normal lifespan and through three successive generations. Amount of chemical (right) is mixed with rat's weekly food ration contained in glass beaker.

TESTS PROVE BUTOXIDE'S LOW TOXICITY

Years of testing insecticide chemicals in Fairfield's research laboratories prove butoxide's unique low toxicity.

In addition, chronic feeding studies were conducted with rats, dogs, goats and monkeys. Cattle were sprayed twice daily throughout the season with butoxide and pyrethrins for four years. Not a trace of butoxide appeared in samples of the cattle's muscle, fat or milk. This resulted in clearance for use of butoxide and pyrethrins on dairy animals.

Laboratory tests made 14 years ago showed DDT's oral LD50 for rats is 200 mg/kg. At the same time the oral LD50 of undiluted piperonyl butoxide for rats was found to be approximately 8,750 mg/kg. Thus, towards rats, Fairfield's butoxide was only 1/43rd as toxic as DDT. By the time the toxicological studies were completed, it was found that the MLD50 for butoxide greatly exceeded the earlier reports. More recent work completed on chronic tests with piperonyl butoxide, completely satisfied the federal regulatory authority for their tolerances and clearances. At the present time all tolerances are based on chronic feeding tests.

For the formulator and manufacturer, Fairfield's butoxide, thus, plays an important role in producing insecticides with greater safety and salability... whether they are products for home, farm or industry. Consult your local Fairfield representative for further information or write today to Fairfield sales headquarters.

Fairfield Development Boosts Insecticide Performance

Butoxide, the best known and the most famous of all insecticide synergists, is a Fairfield research development. It gives insecticide formulators and manufacturers a more effective product...and it saves them money.

Piperonyl butoxide has the unique ability of tremendously increasing the insect killing power of certain chemicals.

For example, 0.125% by wt. of pyrethrins—though seldom used alone today—when applied against houseflies has a mortality of 43%. Cost is approximately $0.07 per pound.

But then add Fairfield's piperonyl butoxide and see what happens. A combination of 0.03% pyrethrins and 0.25% piperonyl butoxide applied against houseflies produces a striking 82% mortality. Cost of the butoxide and pyrethrins combination is $0.03 per pound. Quite a difference in both effectiveness and in price—*doubled performance at half the cost!*

The surging increase in effectiveness is the result of synergism, an action that takes place inside the insect's body. It produces the remarkable kill required in a popular, fast-selling insecticide.

There are other advantages too. Piperonyl butoxide is not only stable, but it acts as a stabilizer for certain other chemicals by reducing the effects of light, air and heat. It screens out deteriorating ultra-violet rays, thus, prevents deterioration of pyrethrins.

And because it is an acid acceptor, it retards decomposition and polymerization of pyrethrum. Since butoxide is also a solvent, it generally makes the addition of other solvents unnecessary —an important consideration when an odor-free product is desired.

And butoxide's synergizer-stabilizer role applies whether the chemical is pyrethrins, allethrin or rotenone.

What this all means is that butoxide puts greater effectiveness into a product and makes it last longer—on the shelf and after it has been applied by the user.

Putting Ideas to Work

fmc FOOD MACHINERY AND CHEMICAL CORPORATION

Fairfield Chemicals

Sales Headquarters

441 LEXINGTON AVENUE, NEW YORK 17, N.Y.

Branches in principal cities. In Canada: Natural Products Corporation, Montreal and Toronto.